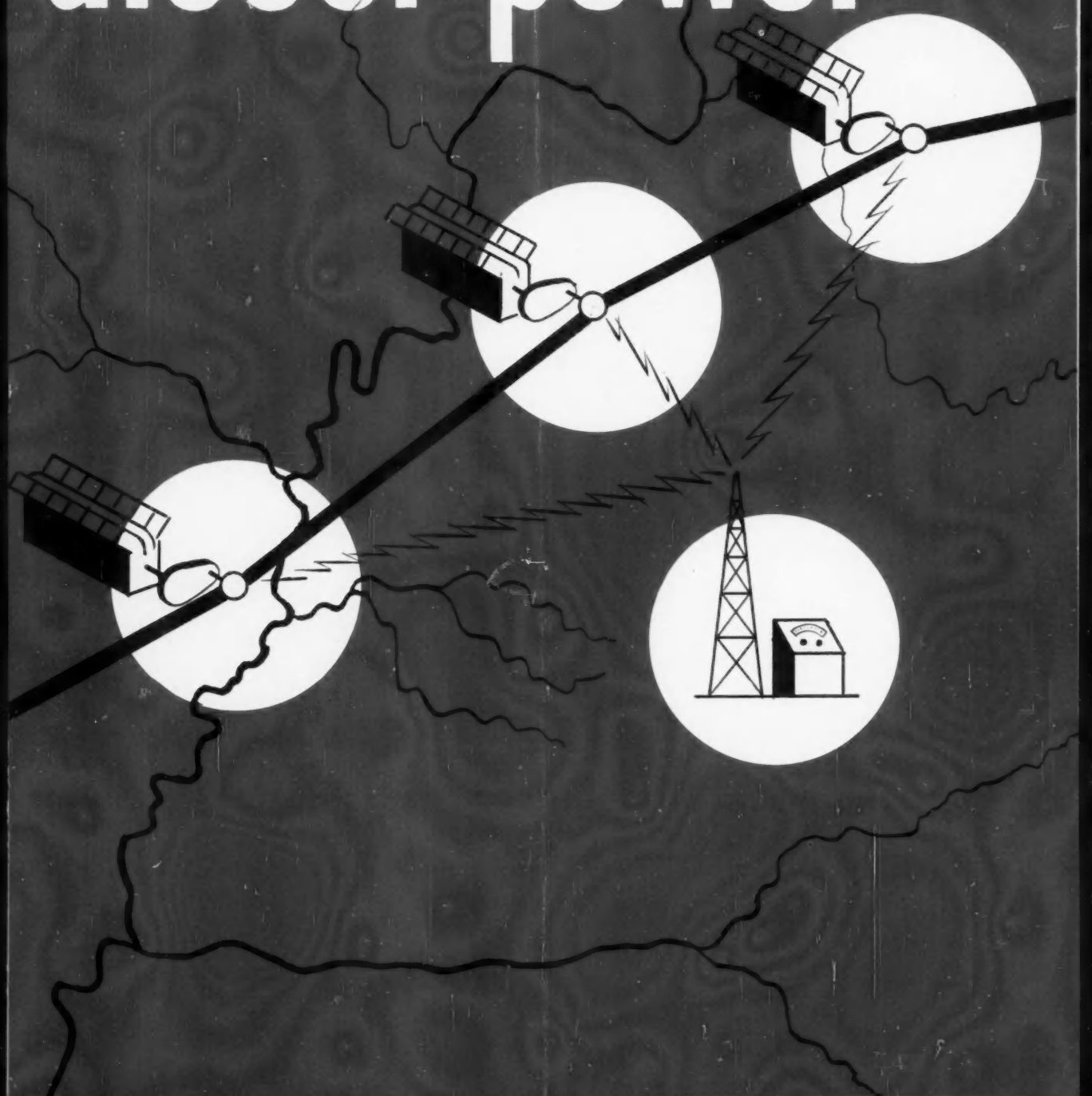
diesel power

February 1958

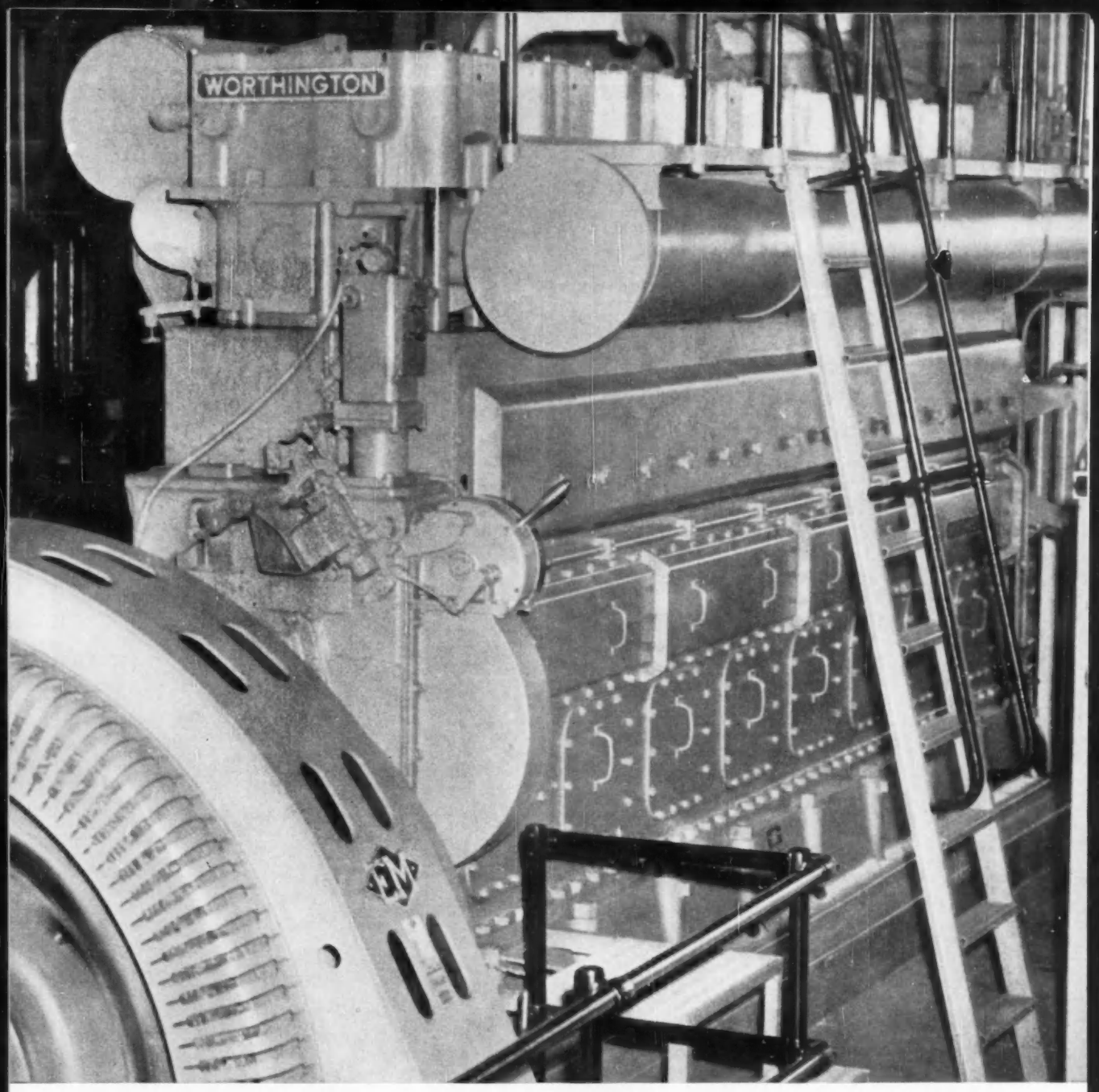


"Texaco Ursa Oil keeps our engines clean. It filters beautifully. We have no lubrication problems." *says Ray Stoltz, Superintendent of Blooming Prairie (Minn.) Municipal Utilities.*

After using Texaco Ursa Oils for twenty-five years, Superintendent Stoltz is so pleased with the results that all competitive attempts to make him change have failed.

Texaco Ursa Oils keep rings free for full-power compression and complete combustion. They resist oxidation—prevent harmful deposits and reduce wear.

And as Superintendent Stoltz points out, "It filters beautifully"—which means it has an extra



long service life. Just ask any Texaco user, there are plenty around.

For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

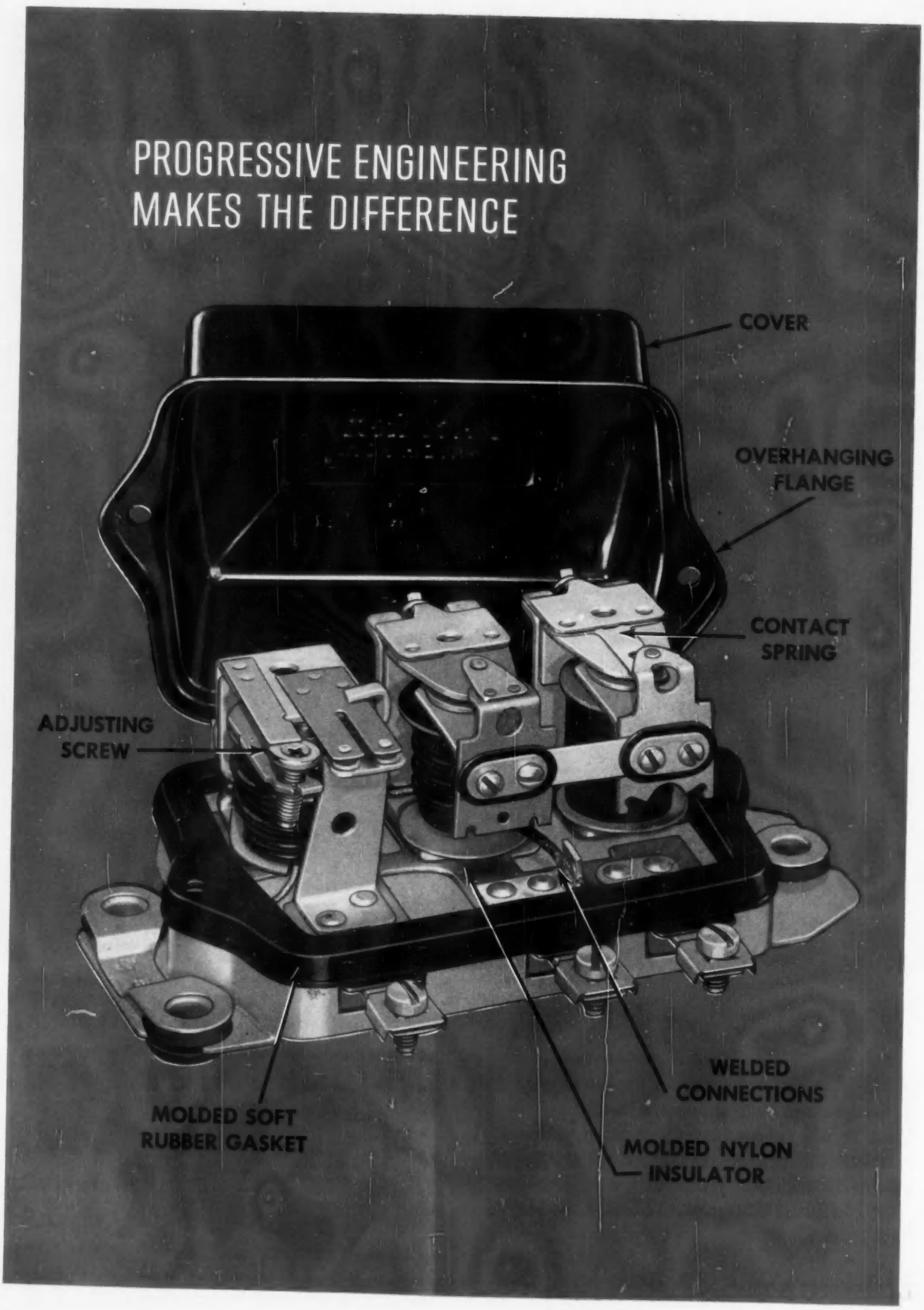
Your Texaco representative can show you why. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Blooming Prairie (Minn.) has enjoyed 25 years of unexcelled service. Its diesels are—and always have been—exclusively Texaco lubricated.

TUNE IN... Metropolitan Opera Radio Broadcasts Every Saturday Afternoon

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)


PROGRESSIVE ENGINEERING
MAKES THE DIFFERENCE
COVER
OVERHANGING
FLANGE
CONTACT
SPRING
ADJUSTING
SCREW
WELDED
CONNECTIONS
MOLDED SOFT
RUBBER GASKET
MOLDED NYLON
INSULATOR

DELCO-REMY WATERPROOF STANDARD REGULATORS IMPROVE FLEET PERFORMANCE

Better electrical performance and greater dependability in any weather are important benefits to fleet operators found in Delco-Remy's waterproof standard generator regulators, now available for general replacement use.

And here are the features that make them the *right* regulators for Delco-Remy equipped cars and trucks in fleet operations.

1. New overhanging one-piece formed-steel cover and mating base shed road splash . . . convenient attaching screws are *outside* the enclosed area. Molded soft rubber gasket seals out harmful oil and water vapors.
2. Integral sleeves of molded nylon insulator form permanent seal around rivets—assure watertight base.
3. New, longer, more flexible armature contact spring on voltage regulator unit assures more positive closing of contact points for smoother operation.
4. Welded electrical connections, and highest quality tungsten and non-tarnishing precious metal contact points, assure minimum resistance, maximum durability.
5. Special fine thread screw-type controls allow easy, highly accurate adjustment of all three units.

Always replace with Delco-Remy waterproof regulators when you service Delco-Remy equipped cars and trucks. These improved regulators, built to highest quality standards by the original equipment manufacturer, are available from your car or truck dealer or the United Motors System.

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

GM GENERAL MOTORS

GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

Cool Sailing

Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered and built to General Motors standards of quality.

Vessel Weathers Grueling Nine-Month Fishing Season With Harrison-Cooled GM Diesel!

The Raider's rugged voyage reaches from the icy waters of Alaska to the sun-drenched regions off San Diego! And Harrison heat exchangers keep engine oil temperatures shipshape for this long haul. Harrison heat transfer equipment provides the optimum in cooling efficiency and economy even under the heaviest loads and continuous operating assignments. That's why you'll find Harrison regulating temperatures in every line of industry and defense. If you have a cooling problem, look to Harrison—with over 47 years' experience in the manufacture of top-quality heat-control products.

TEMPERATURES MADE TO ORDER

HARRISON

GM

HARRISON RADIATOR DIVISION • GENERAL MOTORS CORPORATION • LOCKPORT, N.Y.

editors notes...

You'll want to read about...

How acceptance tests were run on the first dual-fuel engine to go into municipal generation service on Long Island, New York (Pg. 16). The Village of Greenport has supplemented its power capacity with a 1250-kw engine-generator unit. Use of natural gas on an interruptable basis is economic . . . .

How the horsepower of an engine-compressor unit was boosted by installation of two production-type turbochargers (Pg. 22). Success with the first conversion is the impetus for a broad field conversion program . . . .

A new model in Ford's line of industrial diesel engines (Pg. 24). A 6-cyl version of their already-established 4-cyl unit ups the power range available. Units will be sold and serviced through Ford's industrial engine setup . . . .

How snubbers were used to solve an air line pulsation problem (Pg. 26). Breakage due to mechanical fatigue as well as other problems were permanently solved . . . .

Use of protective devices to insure against serious engine damage (Pg. 28). Here's how a protective system to meet your particular requirements can be tailored. Pressure and temperature-sensitive control devices trigger a pneumatic system that does the job you want it to . . . .

You'll want to read about...

Why outstanding service records are no accident (Pg. 29). Here's a trucking outfit getting exceptional performance from its vehicles that is going into spectragraphic analysis of used lube oils to further improve operation . . . .

Developments in a fuel injection pump (Pg. 30) making it suitable for the service on today's and tomorrow's high output engines. Service in these engines is severe and every component must be tough enough to take it or service life suffers . . . .

Simple procedures to check out timing in GM engines should any question arise (Pg. 34). After building up an engine there are two ways to check gear timing—the hard way, involving a lot of disassembly, or the way that is outlined here.

Reports come in that the Service Section is a big help. Are you using it? Also our records of inquiries stimulated by the other Departments show more and more use. We're getting across ideas to help you in your job. Why not make full use of them?

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diesel power

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The Magazine of Piston and Turbine Power

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Diesel Publications, Inc., 80 Lincoln Avenue, Stamford, Conn.

DIESEL FUEL and LUBRICATION

BULLETIN

CITIES SERVICE

WHAT CAUSES LUBRICATION FAILURES?

The biggest single reason for lubrication failure is improper selection and application of lubricants.

Today's lubricating oils are made for highly specialized purposes. The fact that an oil seems ideal for the requirements of one piece of equipment is no guarantee of its qualifications for other machinery.

For example, choice of an oil with low detergency may result in stuck rings, excess cylinder wear, injector clogging, bearing wear and other diesel difficulties.

Next time you're considering what type of oil to use for a certain piece of equipment, call in a Cities Service Lubrication Engineer. He not only has the precise oil for the particular unit you want to lubricate, but may be able to simplify your entire lubrication picture and reduce maintenance costs as well.

USERS ACCLAIM CITIES SERVICE C-300 OIL

From a strip miner comes this report: "Shovel and dragline work 20 hrs. a day, seven days a week. Each have rolled up over 14,000 hrs. with no major overhaul, using Cities Service C-300 Motor Oil."

From a leading stone company: "Our six stationary diesels, powering our compressors and crushers, have averaged 12,000 hours each before major overhaul, with Cities Service C-300 Oil."

From a trucking company: "Our 20 diesels get up to 225,000 miles before overhaul with Cities Service C-300 Oil. We don't even grind the valves before then."

With excellent oxidation resistance, high detergency, and low carbon residue, Cities Service C-300 Oil may be the perfect lubricant for your machinery, too.

Get the facts from a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

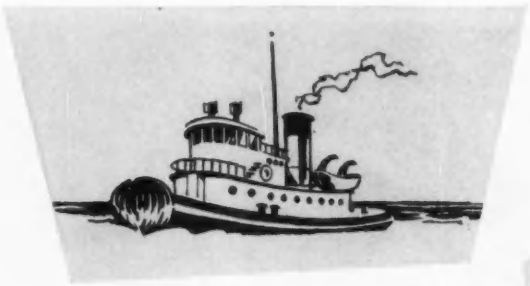
USING A SULPHUROUS FUEL? TRY THIS NEW CITIES SERVICE OIL

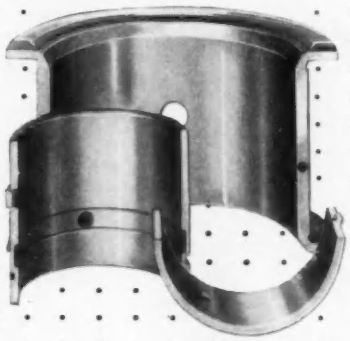
If you're using a diesel fuel with high sulphur content, your motor oil must do more than its normal share of work to fight engine deposits.

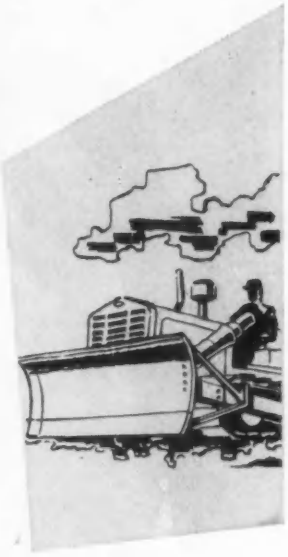
Cities Service C-100 Motor Oil has been formulated for just this purpose. Under dusty, dirty, and sulphurous conditions, it provides excellent engine lubrication and protection. Talk with your Cities Service Lubrication Engineer for details.

MAN YOU SHOULD KNOW

Barney Fleming is the Regional Manager of Industrial Oil Sales at the Cities Service office in St. Paul, Minnesota. With a background of 35 years as a lubrication engineer and a talent for solving problems, he is typical of the Cities Service engineering staff that's at your service. A call to the nearest Cities Service office will bring a member of this staff to your plant or job site.



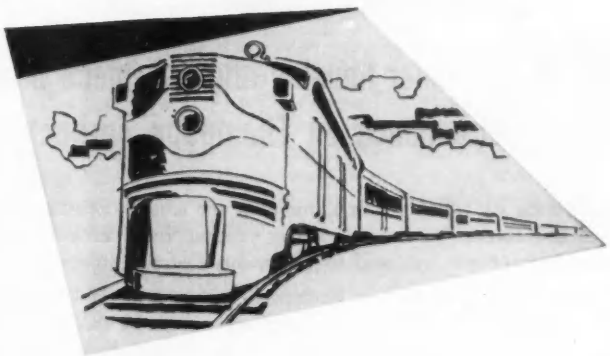




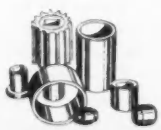
Higher Horsepower Demands the Greater Strength of JOHNSON Aluminum on Steel BEARINGS

With the trend in diesel engines toward ever higher horsepower, the permanently bonded aluminum on steel bearings developed by Johnson Bronze rapidly are becoming standard for heavy diesels. Designed to take loads as high as 5000 psi, they are ideal for heavy-duty, high-speed engines.

Johnson Bronze pioneered in the development of aluminum on steel bearings, and today is a leading supplier. We can furnish a wide range of plain or flanged, full or half bearings, with or without precision overlay. Take advantage of our years of experience and special production facilities—your Johnson Bronze representative will be glad to give you full details on how Johnson aluminum on steel bearings can improve your engine's performance. Johnson Bronze, 470 S. Mill Street, New Castle, Pa.



JOHNSON Bearings



POWDER METALLURGY—BRONZE OR IRON

ALUMINUM ON STEEL CAST ALUMINUM ALLOY

BRONZE ON STEEL

STEEL AND BABBITT

GRAPHITED BRONZE

BRONZE—CAST OR ROLLED

NEW! Simpler housing and one-piece bearing reduce maintenance on Thompson Turbocharger

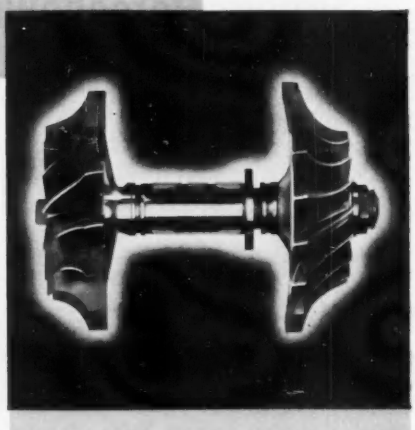
Designed for 10,000 operating hours under the severest operating temperatures and speeds. This means longer revenue runs between scheduled maintenance of the unit, and fewer unscheduled downtimes for repairs.

Turbine housing of the new Thompson Turbocharger is a heat-resistant alloy designed to eliminate corrosive attack and to be free from service cracks. Design also isolates high-temperature exhaust drive from bearing and air-side of turbocharger to increase maintenance-free life.

Bearing is one-piece design, mounted on small diameter shaft to reduce bearing surfaces speed even at high rpm.

Design of impeller supplies supercharging air at equal compression ratios over a larger flow range and at lower rotor speeds than other turbochargers. Light-alloy rotor provides instant response to changes in engine speed and load.

Your blown diesel engines up to 300 horsepower can be readily equipped with new-design Thompson Turbochargers. Our engineers will help. When may they call?



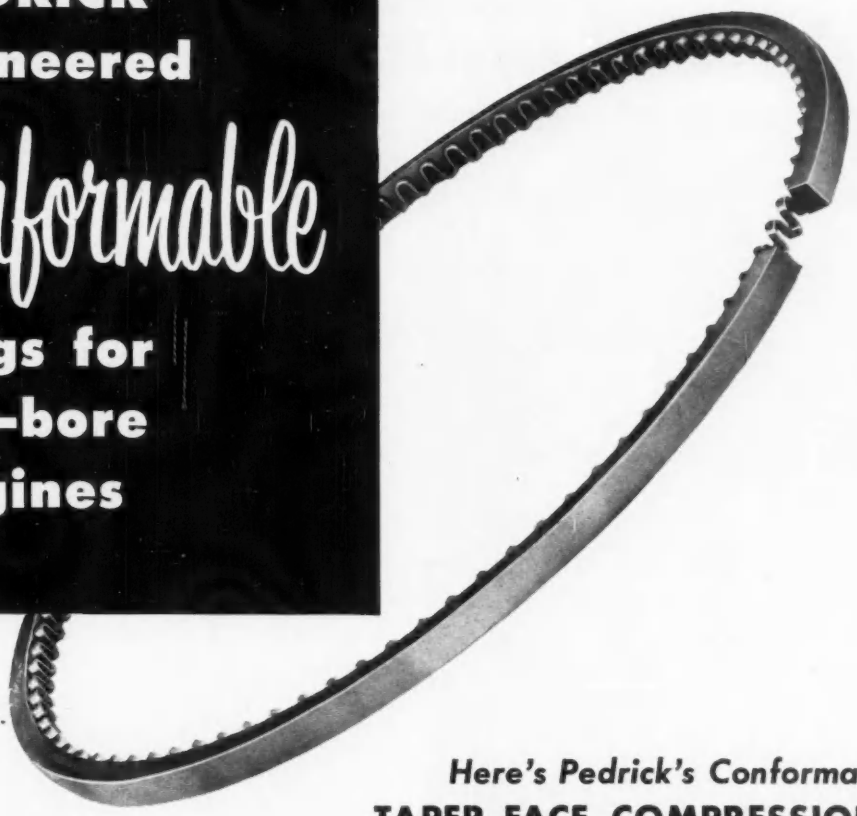
Write today on your company letterhead for Booklet DP-258 which contains technical data on Thompson Turbochargers for blown diesel engines up to 300 horsepower.

JET DIVISION

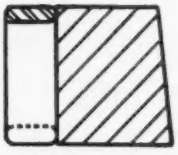
Thompson Products, Inc.

Cleveland 17, Ohio

PEDRICK pioneered *Conformable* rings for big-bore engines



U.S. Patent No. 2,771,329



TF7 DESIGN

This design is recommended especially for 4-cycle engines

Here's Pedrick's Conformable
TAPER-FACE COMPRESSION Ring

The big feature of the TF7 taper-face compression ring is its conformability under all kinds of cylinder conditions. Because of PEDRICK's exclusive "Equalizer," which exerts a positive and uniform pressure outward at every point around the ring circumference, the cast-iron section is radially thinner, and therefore more flexible.

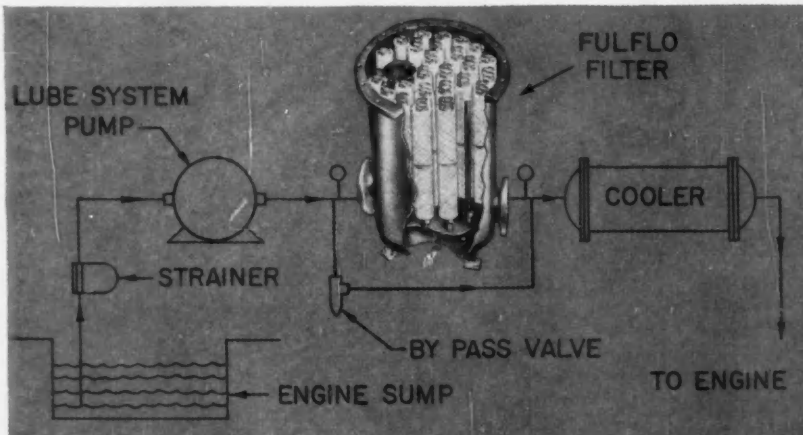
The taper-face of this conformable compression ring provides a line contact with the cylinder wall for higher unit pressure, quicker seating and sealing and less chance of scuffing.

The TF7 ring is one of numerous modern designs used by PEDRICK engineers to *precisioneer* the very best combination of rings for maximum results in each particular installation. Take advantage of our Engineering and Consulting Service to help solve your ring problems. Write, wire or phone: WILKENING MANUFACTURING CO., Philadelphia 42, Pa. SAratoga 9-3770. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2.

Pedrick® PISTON RINGS

Get longer engine life —

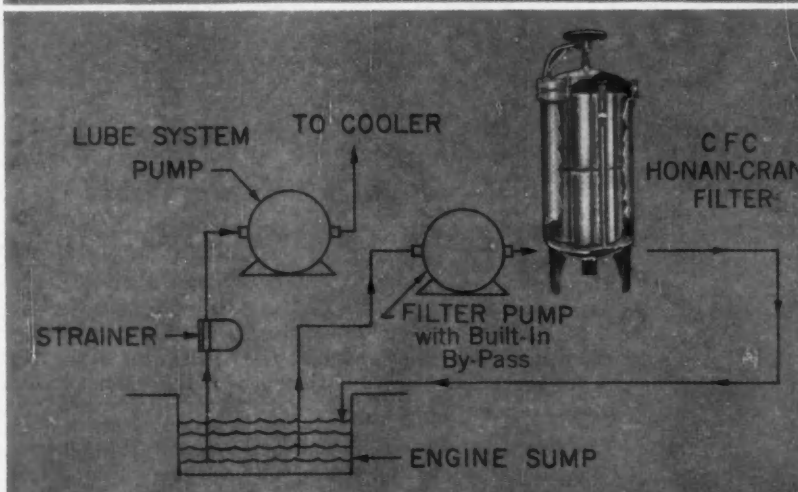
with Fulflo and CFC Honan-Crane Lube Filtration Systems



FULL FLOW SYSTEM

For True Depth Filtration: Fulflo Filters with genuine Honeycomb Filter Tubes (illustrated) provide micro-clarity of lubricating oils . . . for stationary engines, mobile equipment and for bulk filtration.

For Surface Full Flow Filtration: CFC Flo-Pac is offered in a variety of models using 1 to 36 resin-impregnated pleated paper cartridges.



BY-PASS SYSTEM

The CFC Honan-Crane Multi-Cartridge Filter (illustrated) offers seven types of interchangeable cartridges — inert media for solid contaminants, or Cranite (fuller's earth) for removal of solid particles and all products of oxidation.

CFC Michiana Filters, furnished as original equipment for many leading diesel engine builders, are available in a variety of models to provide rugged, efficient service, within a minimum space requirement.

Fulflo Filters for diesel ***fuel*** may be applied to either pressure or suction side of fuel line.

For new catalog, write today to Department DR

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo Filters — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC Filters — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

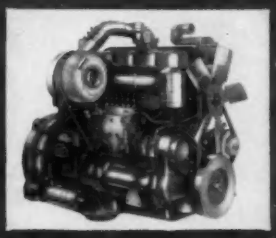
SCHWITZER TURBOS

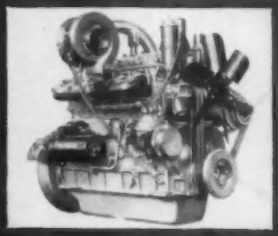
Best For Your Operation

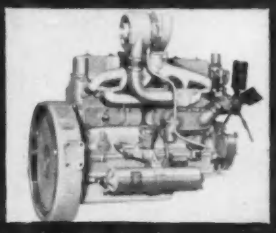
MOST HOURS IN THE FIELD

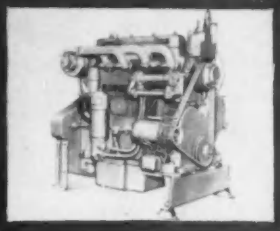
GREATEST NUMBER IN OPERATION

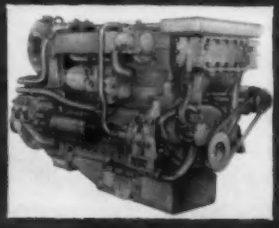
BEST INSTALLED PERFORMANCE

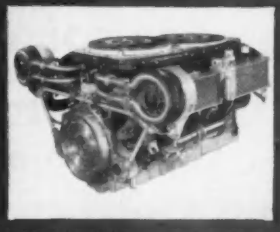












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"More Power And Less Smoke"

"Over 200,000 Miles Without Attention"

"Thousands of Hours And Still Going Strong"

"Power When You Need It—And No Lag"

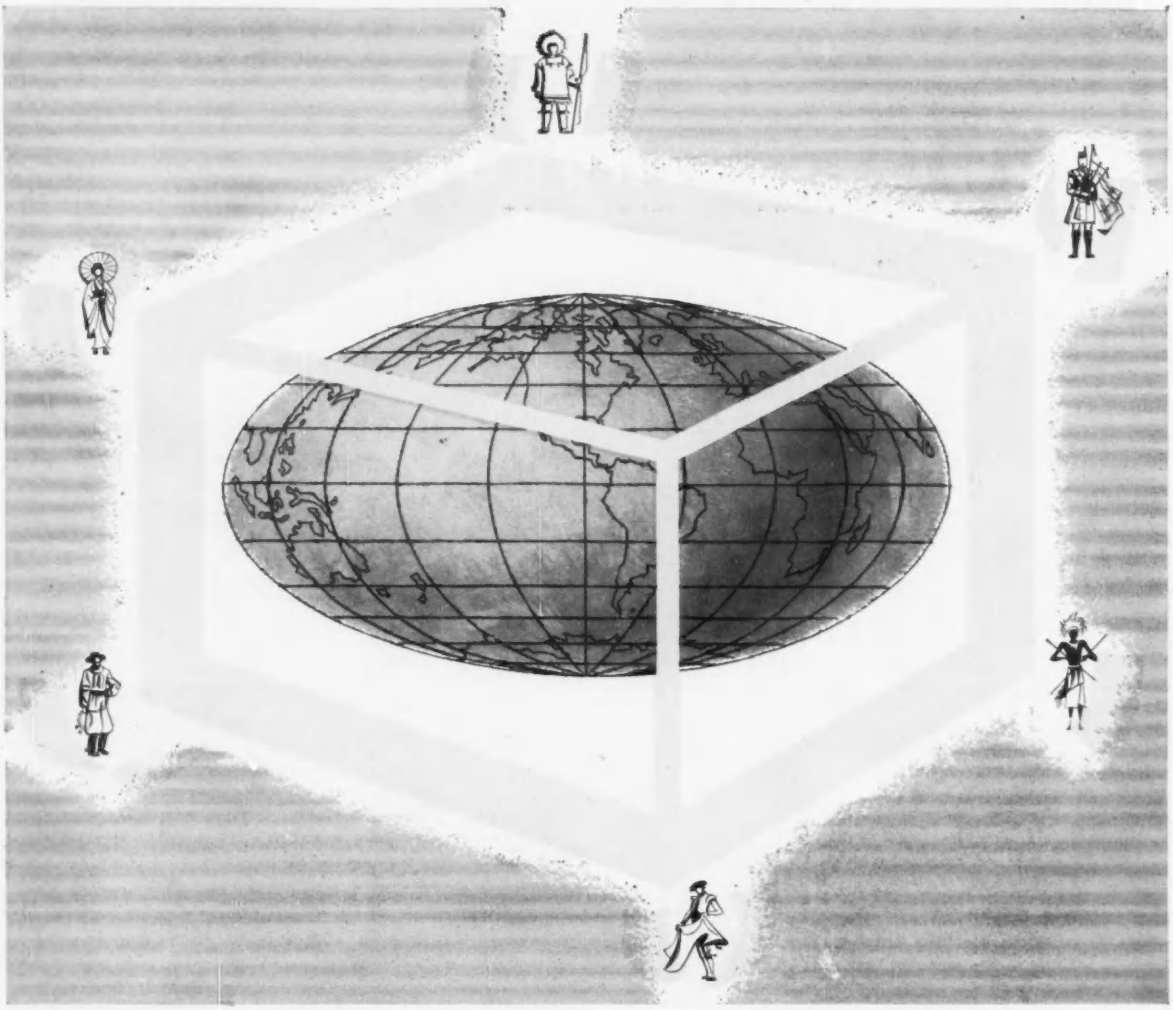
"More Usable Power With Schwitzer Unit"

CALL ON SCHWITZER FOR THE EXPERIENCE OF MORE AND VARIED PRODUCTION INSTALLATIONS

STAY AHEAD WITH

SCHWITZER
CORPORATION
INDIANAPOLIS, INDIANA

FANS • DAMPERS • PUMPS • SEALS • SUPERCHARGERS • MODULATED DRIVES • AIR MOTORS



In the far corners of the globe...

The performance and the brand are the same around the world

Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

Rimula® Oil reduces cylinder and bearing wear caused by acidic combustion products that are increased by low jacket temperatures. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods...effecting worth-while savings in labor and parts.

Rimula Oil, regarded in the U.S.A. by manufacturers and operators as an indispensable accessory to heavy-duty vehicular operation, is available to your customers abroad under the same brand. For full information, write: Shell Oil Company, 50 West 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Calif.

Other outstanding Shell Industrial Lubricants

Shell Tellus Oil—for closed hydraulic systems

Shell Alvania Grease—multi-purpose industrial lubricant

Shell Turbo Oils—for utility, industrial & marine turbines

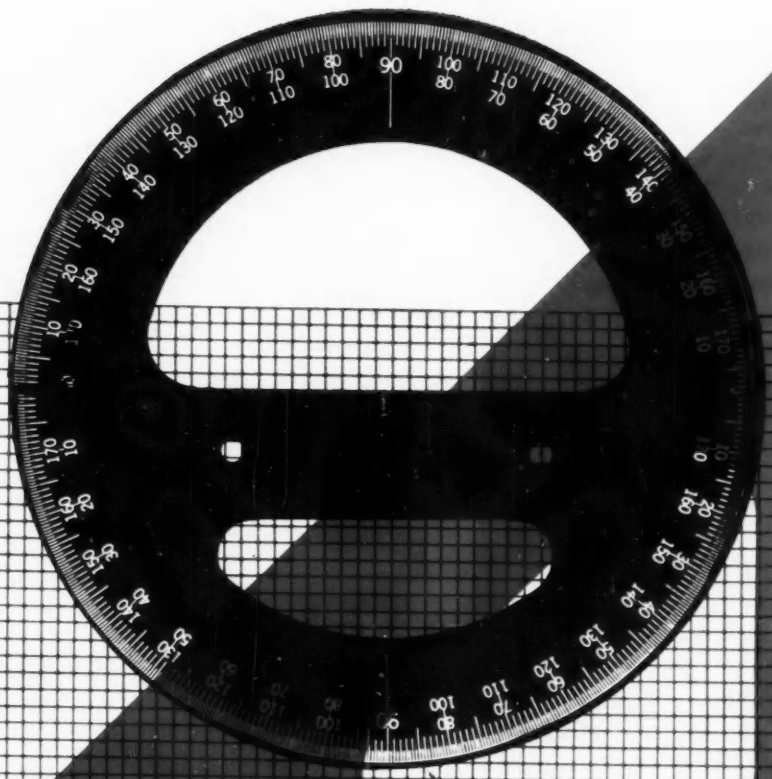
Shell Dromus Oil—cutting oils for high-production metalworking

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

SHELL RIMULA OIL

SHELL

diesel power



ENGINE SPECIFICATIONS

DIESEL POWER'S APRIL ISSUE

will contain —

You know from experience that the **April Diesel and Gas Engine Specification Issue of DIESEL POWER is the most popular of all the monthly issues**—you know too that often your copy, for one reason or another, does not always remain in your possession—you can't keep your hands on it because it serves the purpose of so many different people in your organization. Please, this time, don't write to us for extra copies *after* the magazine has been printed—**WE WILL BE SOLD OUT**—we have been every year. If you want extra copies of this issue for yourself or some of your friends (business associates), please **let us know before April 1st.** After we go to press, we will have only **a limited number of copies available and they will be allocated on a first-come, first-served basis.**

Your company will probably supply you with extra copies of the **1958 Diesel and Gas Engine Specifications** as they have in the past. For you that have not been receiving copies, order through your company—and while you're at it, **make sure that your company is advertising in this issue**—you'll see it wherever you go. It will be like an extra call for you—it will cut down on your time in the reception room—make you welcome and you'll help to keep your accounts sold too. You will find that the most outstanding engine and equipment manufacturers as well as suppliers to the diesel industry will be represented by advertising in the **Annual April Diesel and Gas Engine Specification issue of DIESEL POWER.**

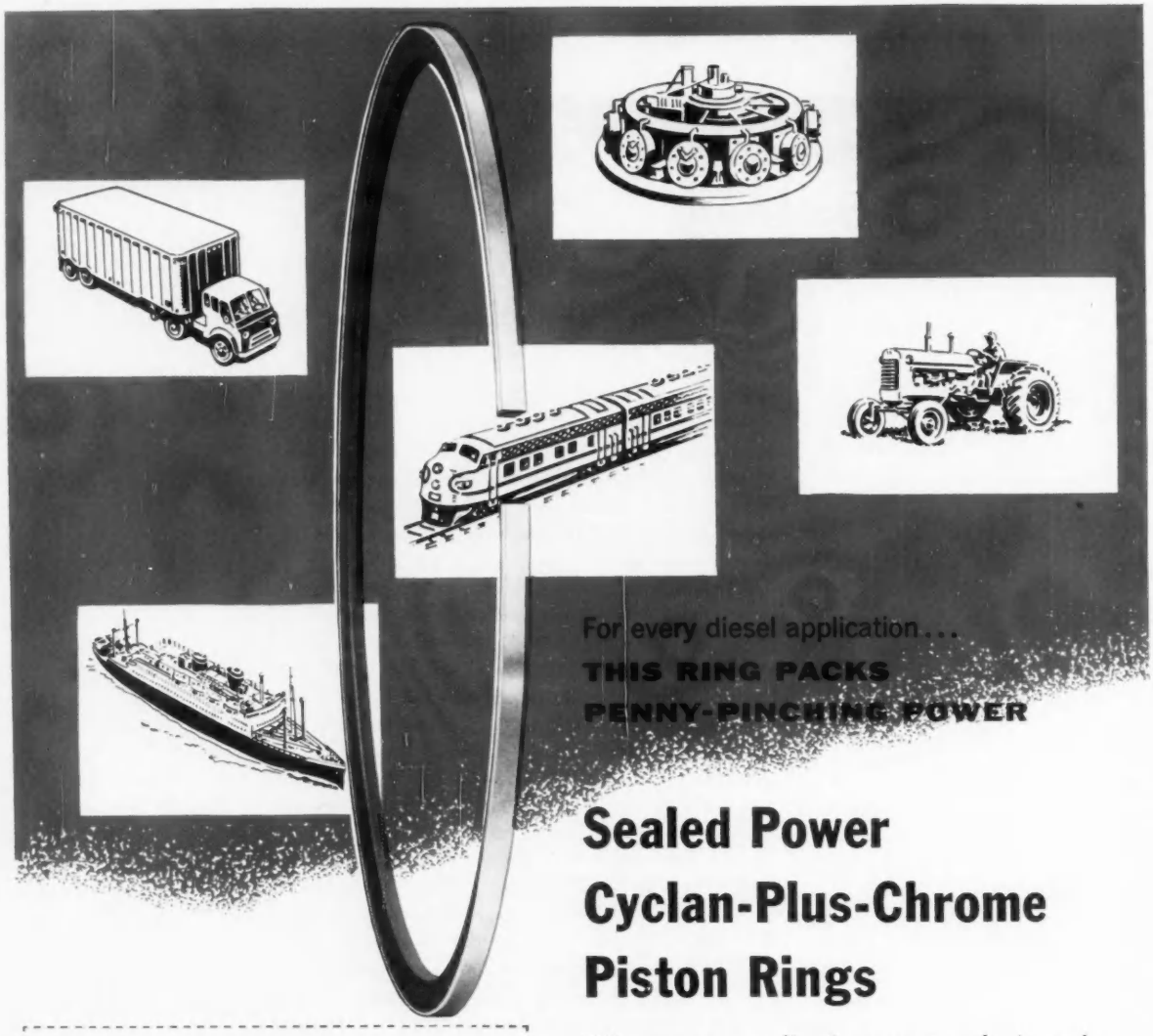
Make sure that your company's advertising is in this issue too. It will make your selling job easier. Just send this page to the home office with a note. They'll know you mean—BUSINESS—EXTRA BUSINESS.

Editorially speaking -

Warranty Abuses Cost You Money

Warranty is like liquor—fine when handled properly, miserable when abused. So don't let it go to your head. It is one way that users can help control costs of what they buy. Reputable manufacturers and service facilities stand behind their product or work and since warranty is not without expense, figure it in their overall costs. We heard that "Oh, yeah?". You're a user, aren't you? And you have a gripe. Sit on the other side a while and you'll see that they have gripes too—enough to make a cynic of anyone. Argue on warranty claims? Darn right, and with good cause. Saw a case just recently. Three of a batch of rebuilt governors were returned to the service shop under warranty. One was tagged "Binding". It couldn't be mounted for testing; one mounting hole was mashed in. You can't drop a precision mechanism like a hydraulic governor without expecting something to happen. Claim disallowed. Second tag read "No oil pressure". Flushing a little dirt from the pressure relief valve fixed that one. No charge. The third tag said "Fell apart internally". It sure did—with a little help. During installation, it is necessary to depress the servo piston manually. It was done—with a screwdriver and marks on the bushing proved it. The piston hung up and the housing was opened to see what was wrong. The flyweights got mixed up with a probing screwdriver. All the evidence was there. Claim disallowed—and why not? On these contract jobs the price had been whittled down to rock bottom. There was no cushion for absorbing someone else's mistakes. If the shop absorbs it, it has to show up in a higher contract price. By now you see what we mean. There are two things against abusing warranty. First, it probably won't be allowed. Service people are getting pretty sharp at tracking down the real cause of trouble. Second, you're not getting something for nothing because you'll pay for it in higher costs. You need the manufacturer or service facility and he needs you. Play it square; you'll get away cheaper in the long run.

BPE



For every diesel application . . .
THIS RING PACKS PENNY-PINCHING POWER

Sealed Power Cyclan-Plus-Chrome Piston Rings

Wherever you put diesel power to work—in trucks, locomotives, earth-moving equipment, stationary or marine engines—*this* ring will give you more service with less maintenance. *This* cyclan-plus-chrome ring positively defeats excessive heat. Forget about breakage, side-wear, friction and corrosion. *This* ring licks them where other rings fail.

Thanks to Sealed Power's unrivalled diesel know-how, these unique rings break in fast. And thanks to cyclan-plus-chrome, they last—and last—and last. It's a fact . . . When it comes to diesel economy, no other rings stack up to these.

SLEEVES AND SLEEVE ASSEMBLIES FROM THE WORLD'S MOST EXPERIENCED MANUFACTURER

Sealed Power built and staffed an entire plant solely for the engineering and manufacturing of sleeves.

That's why Sealed Power has more know-how, more experience to draw on in this highly specialized field. And its products prove it.

Every diesel sleeve, each sleeve assembly is designed and manufactured with precise care every step of the way. It's matched for top performance and subject to rigid Sealed Power quality controls.

Leading Manufacturer of Automotive and Industrial Piston Rings Since 1911

Sealed Power Corporation • Muskegon, Michigan • St. Johns, Michigan • Rochester, Indiana • Detroit Office • 7-236 General Motors Building • Phone Trinity 1-3440

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PISTONS • CYLINDER SLEEVES

Largest Producers of Sealing Rings for Automatic Transmissions and Power Steering Units

highlights

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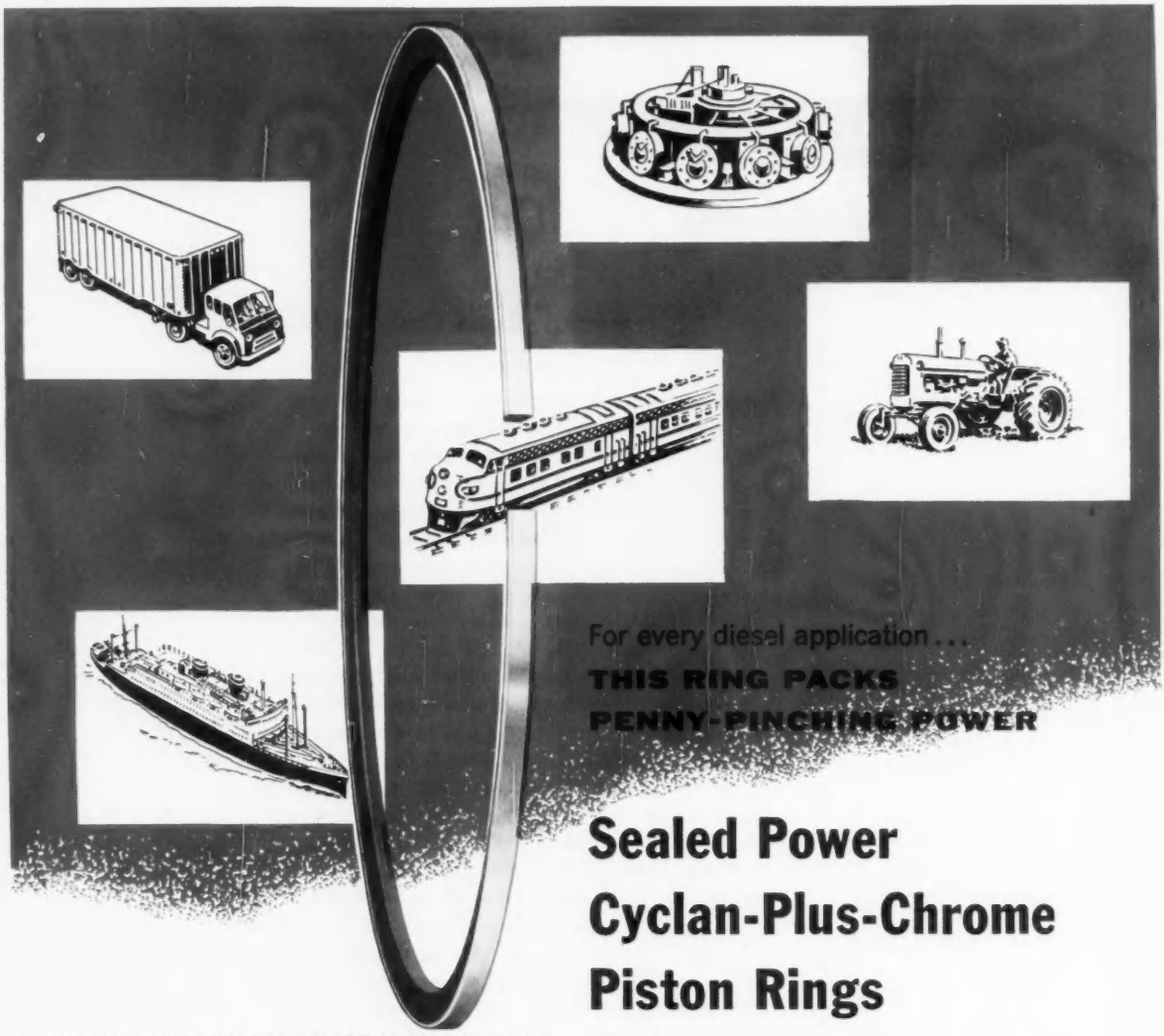
More efficient handling and shipping of goods by all common carriers is possible through development of standard size shipping containers — pallet containers, cargo containers and van containers. This was the unanimous agreement of representatives of packaging, materials handling and transportation fields at an American Standards Association conference. It's one way to cut shipping costs.

Completion of Army's remote-controlled tractor project has been assigned to 23-yr old Private F/C M. Shipe. Under a new scientific and professional personnel program, qualified soldiers are given technical assignments they can handle with their education and training. Radio-controlled tractor is to work unattended in radio-active and combat zones. Question — If Shipe is that good, why not give his stripe to the tractor and promote him?



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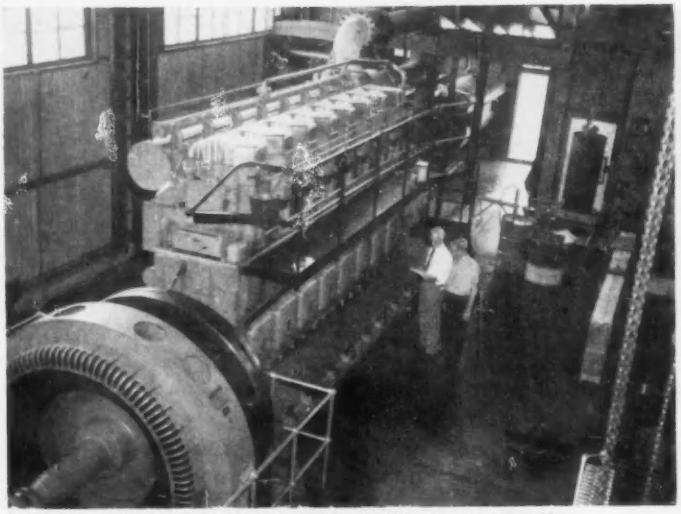
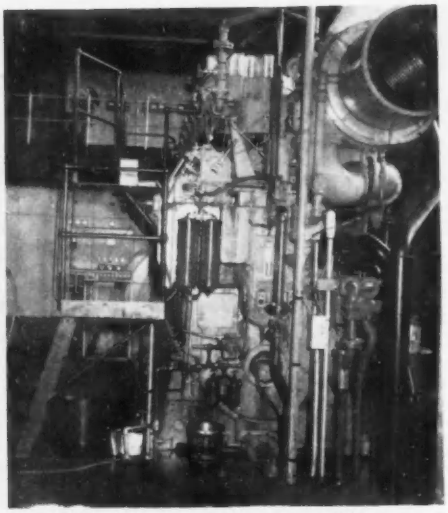


Enterprise engineer at right and Barker & Wheeler representative at left, check readings during fuel oil consumption test at Greenport. Fuel tank on scale is seen at right. Engine panel board is behind scale.



Switchboard is seen behind engine. Elliot turbo is at upper right. Woodward governor, fuel oil strainers and filters and other accessories are also visible.

Greenport Runs Engine Acceptance Tests

First dual-fuel unit in municipal power generation service on Long Island, a 1250-kw Enterprise engine-driven generator, lives up to contract guarantees easily. Load and fuel consumption tests run by Greenport Municipal Power Plant indicate dependable and economical service for many years to come.

ENGINES must prove they can do what their builder guarantees. Fuel consumption, load-carrying ability, operating temperatures under certain conditions, etc., are all specified in the contract. Engine acceptance tests are generally run within a specified run-in period after installation. One such test was recently held at the Village of Greenport, L. I., N. Y., Municipal Power Plant. Here a 1250-kw, Enterprise Model DGSQ-38, dual-fuel, turbocharged engine was put through its paces.

This 8-cyl unit, the first dual-fuel engine installed on Long Island, has a 16-in. bore, 20-in. stroke and is rated 1762 hp at 360 rpm. On November 26, the first day of the test, the unit already had 2380-hr of satisfactory operation on both fuel oil and natural gas. Barker and Wheeler, the consulting engineers who wrote the specifications for the building addition, generator set, transformer and switchgear, represented Greenport at the test. Two Enterprise engineers represented their company. The plant was under general operation by its regular engineers.

Fuel Consumption Tests

To run a half-load fuel oil consumption test, the dual-fuel unit was started and brought up to operating speed. The governor was set so the engine could not pick up more than half its rated load. When proper cooling water and lube oil inlet and discharge temperatures were reached, the engine was synchronized with a unit already on the line. This unit, a Fairbanks-Morse, 8-cyl, Model 37, 1000-kw generator set, was used throughout the tests to control the load on the dual-fuel unit. In this case it carried anything over 625 kw.

With the dual-fuel engine at half-load, the weight of fuel used from a tank set-up on an accurate scale was recorded every 15 minutes. At the end of each 15-minute period the tank was refilled and weight checked again.

During these 15-minute runs, readings were constantly recorded from the watthour meter, ammeter, voltmeter, power factor meter, station service meter, engine room barometer and thermometer. The d-c ammeter and voltmeter readings for the exciter, as well as fuel oil pressure, jacket water and lube oil pressures and temperatures, raw water pressure, intake manifold pressure changes and individual exhaust temperatures were also recorded. This half-load test continued for one hour.

The governor was then reset to permit the engine to

TABLE I

Fuel Oil Test	*½ Load*	*¾ Load*	*Full Load*
1. Kwh Output	660	985.5	2538.2
2. Aver. Power Factor	96.1	98.0	97.3
3. Bhph Output	942.2	1390.5	3557.1
4. Oil Used, lb	343	487	1281.5
5. Corrected Usage, lb Line 4 x 19540 Btu/lb / 19350 Btu/lb	346.4	491.8	1294.1
6. Oil per Bhph, lb Line 5 / Line 3	0.367	0.353	0.364
7. Guarantee	0.400	0.375	0.375
8. Under Guarantee, % Line 7 — Line 6 / Line 7	8.25	5.86	2.93
9. Gallons Consumed Line 5 / 7.145 lb/gal	48.5	68.8	181.1
10. Kwh per Gal Line 1 / Line 9	13.6	14.3	14.0
11. Btu per Kwh	10,154	9655	9865

TABLE II

Gas Test	*½ Load*	*¾ Load*	*Full Load*
1. Kwh Output	712.3	905.0	2465.8
2. Aver. Power Factor	92.1	95.5	98.0
3. Bhph Output	1019	1279	3457
4. Pilot Oil Used, lb	37	38	72
5. Gas Used, cu ft	6500	8100	22,100
6. Gas Used, corrected*	6507	8109	22,125
7. Btu Consumed			
Oil, HHV **	722,980	742,520	1,406,880
Gas, LHV	5,875,835	7,322,444	19,978,215
Total	6,598,815	8,064,964	21,385,095
8. Btu per Bhph			
Test (Line 7/Line 3)	6476	6306	6186
Guarantee	8000	7200	6800
9. Under Guarantee, %	19.0	12.4	9.0

* Corrected to 68°F & 29.92-in. hg. guarantee condition

** Based on 19,540 Btu per lb

pick up no more than three-quarter load and the above procedure was repeated for another hour. The same was done after the governor was set for full load, except that this test was run for two hours. This completed the tests with the engine operating on 100% fuel oil. The fuel consumption test with the engine operating on natural gas was made the next day.

The engine is always started on fuel oil even when it is to be run on natural gas. After it is carrying about quarter load, it is switched to gas by simply moving a lever. Pilot oil for ignition is then the only oil used. Such was the case when making the gas consumption test. After the engine was started and normal operating temperatures and pressures were reached, the unit was again synchronized with the F-M engine. With its governor set for half-load maximum, the engine was permitted to pick up about quarter load and switched to gas. Then it was made to pick up half load.

At 15-min. intervals, readings were recorded from all instruments previously mentioned plus the gas meter. This half-load test was run for one hour. After the governor was reset for three-quarter-load maximum and the engine loaded to this limit, this test was run for one hour. The same was done for two hours after the governor was reset and the engine fully loaded.

Test Results

During the test, a fuel oil sample was sent to Socony Mobil Oil Co. for analysis. This analysis showed that the high heat value was 19,540 Btu per lb and 139,800 Btu per gallon. Low heat value was 18,340 Btu per lb and 131,200 Btu per gallon. Weight per gallon was 7.145 lb. High heat value for the natural gas, as given by the supplier, the Long Island Lighting Co., was 1001 Btu per cu ft.

All calculations were based on these figures. All bid guarantees were made on a high heat value for oil of 19,350 Btu per lb., and a low heat value for gas of 1000 Btu per cu ft. All test data were adjusted to these basic figures. Table I shows the comparison between fuel oil consumption guarantees and test consumptions and other pertinent test data. Table II shows the same for gas. These tables show that both fuel oil and gas test consumption figures are lower than the guaranteed figures given by the Enterprise Engine & Machinery Company.

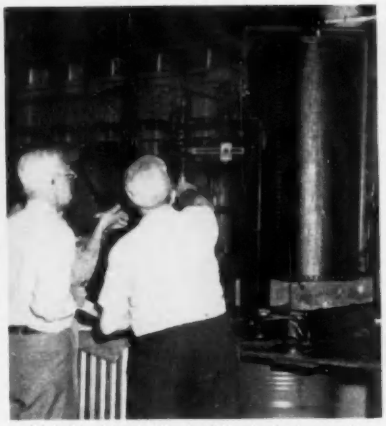
Consistency of the oil and water pressures and temperatures and cylinder exhaust temperatures during the various load runs indicated satisfactory operation during the test runs.

The contract with the Enterprise Engine and Machinery Co. included, in addition to the engine-generator unit, the General Electric Co., Scott-conversion transformer, and Electric Machinery Mfg. Co. switchgear.

The Greenport generating plant is somewhat unusual. The original plant and distribution system is 2400-v, 2-phase, 4-wire. The new generator is 4160-v, 3-phase, 4-wire. With this new generator installation it was necessary to install a Scott-type, 2-phase-3-phase, conversion transformer between the old 2-phase bus and new 3-phase bus.

At the time the new generator was put on the line, the Shelter Island feeder was changed-over from 2-phase, to 3-phase. Thus there are 2-phase, 2400-v feeders and 3-phase, 4160-v feeders being supplied with power from

Air intake filter and silencer is seen at right of building. Maxim silencer heat recovery unit is in shed at left end of plant.



Weight of fuel oil in tank is checked on scale at end of fuel consumption test run by Enterprise and Barker & Wheeler engineers.

Two motor-driven lube oil pumps and lube oil filter are located in basement below engine room. One pump is used for standby.

this one generating station. Therefore, power is sometimes converted in the transformer from 2-phase to 3-phase and other times from 3-phase to 2-phase.

Some difficulty was experienced in a similar situation in another village with high neutral currents and consequent above-normal heating of cables. Experience and knowledge gained from this village's problems prevented these difficulties from occurring at Greenport. By installing a grounding reactor, and a 3-phase, ungrounded, delta-to-wye grounded station service transformer bank and by placing all 3-phase power leads from generator to switchboard and from switchboard to conversion transformer in one conduit, inductive heating effect between conductors was reduced.

The Scott transformer performed satisfactorily during the tests and excessive neutral currents did not occur. Even with an overload of about 25% no neutral cable heating was noticed. The switchgear operation, oil circuit breakers and instrumentation performed satisfactorily.

After considering that the diesel-generator, phase-conversion transformer, switchgear, circuit breaker, and instrumentation had been in operation over 2400 hours and met bid guarantees, Barker & Wheeler approved final acceptance under the contract.

Anticipated Savings

The accompanying curves show a comparison of combined fuel and lube oil cost per kwh for each engine. The yearly average fuel and lube oil cost curve for the Enterprise will lie somewhere between these oil and gas cost curves, depending upon natural gas availability.

Based on test run data, estimates of engine load factor and natural gas availability, it is estimated that for the same number of kwh generated during the year ending May 31, 1957, about $18,000 in fuel costs will be saved. About $3300 will also be saved in lube oil cost making a total of $21,300.

These savings are based on the use of fuel at 11.16 cents per gal (average for the past year) and on gas purchased as follows: first million cu ft or less—$750; next million cu ft—6 cents per 100 cu ft; over 2 million cu ft—5.2 cents per 100 cu ft. If gas is not available for a whole month, the minimum monthly charge is prorated for the period during which it is available. This can happen since the natural gas is purchased from the Long Island Lighting Co. on an interruptable basis.

Interruptable periods occur during winter months when due to very cold weather, customer heating demand for natural gas is very high. LILCO then supplies manufactured gas for peaking. The Enterprise dual-fuel engine can operate on this manufactured gas after making slight adjustments.

The plant's repair costs for the past four years have been about $68,000 or 2.17 mills per kwh. From experience with diesel plants operating more modern engines, it is estimated that future repair costs will be reduced by at least 50%. This will produce additional savings of about $8,000 per year.

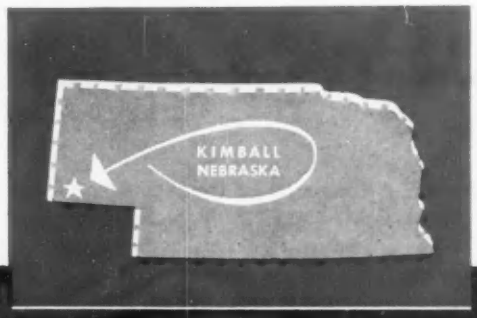
Background

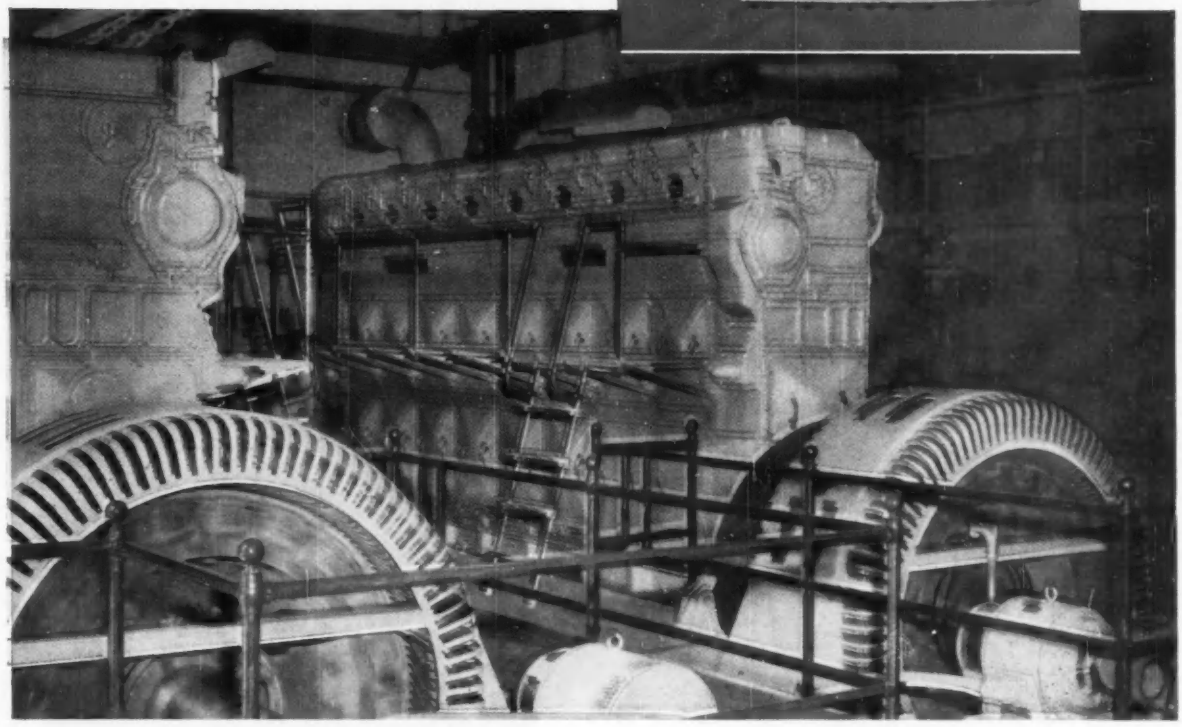
The original Greenport steam power plant when started in 1887 was privately owned. The Village of Greenport bought it in 1889. In 1927, the first diesel went into this plant. This, a 300-kw, 4-cyl, air-injection Busch-Sulzer, was followed by a 419-kw, 6-cyl Busch-Sulzer in 1929. A 750-kw, 8-cyl, solid-injection McIntosh & Seymour was added in 1932 and the 1000-kw, Model 37 Fairbanks-Morse unit in 1941. Due to a broken crankshaft on the smaller Busch-Sulzer, a 6-cyl, 720-kw General Motors generator set was bought in 1948. All these units are still in service and in good condition.

The power plant normally serves the 2800 people of Greenport plus the 1200 on Shelter Island, a summer re-

(*Continued on Page* 20)

Kimball's power plant saves $58,000 yearly!





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SUPERIOR DUAL-FUEL ENGINES

Six years ago, fast-growing Kimball, Nebraska decided to modernize its inadequate power plant. Today, powered by three Superior Dual-Fuel Engines, Kimball's power plant is saving $58,000 a year over private utility rates. The engines operate with natural gas at an average cost of 6.93 mills per KWH. On diesel fuel alone power costs are 10 mills per KWH, and annual savings would be $35,000.

The first engine paid for itself in savings in less than three years! Repeat orders later demonstrated the confidence of Kimball city fathers in Superior engine quality. As a further bonus, the three engines are expected to give good service for 35 to 40 years, according to the town's Public Works Director.

Such *savings, satisfaction* and long-term *service* are characteristic of White's Superior engines. See how you can participate in "Kimball-type" savings. Call or write the nearest office listed below. Let White's engineers discuss the new features of Superior and Atlas engines, ranging from 100 to 2150 H.P., for power to 1500 KW.

White Diesel

WHITE DIESEL ENGINE DIVISION

THE WHITE MOTOR COMPANY Plant and General Offices: Springfield, Ohio

SALES AND SERVICE POINTS: Ketchikan, Alaska • San Francisco, Terminal Island, California • Denver, Colorado • Washington, D. C. • Clearwater, Florida • New Orleans, Louisiana • Boston, Mass. • Park Rapids, Minnesota • Webster Groves, Missouri • Callaway, Nebraska • New York, New York • Portland, Astoria, Oregon • Ft. Worth, Houston, Texas • Seattle, Wash. • Halifax, Nova Scotia • Vancouver, B. C.

Greenport Acceptance Tests

(*Continued from Page* 18)

sort. However, in the summer the population of Shelter Island increases to 15,000, raising the peak load to 2200 kw. For this reason plus further increases in load expected in the future, it was decided to buy the 1250-kw Enterprise. This engine is now used in conjunction with the F-M to carry the high loads and a combination of the other units serves as a standby.

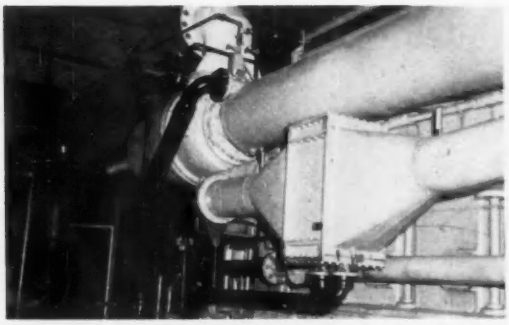
The $350,000 needed to buy the new unit and build an extension to the plant was obtained as follows: $200,000 through a bond issue; $110,000—depreciation reserve fund; and $40,000 from current earnings, federal bonds and deposits.

Plant operation through the years had been so profitable that a $110,000 reserve fund had been accumulated.

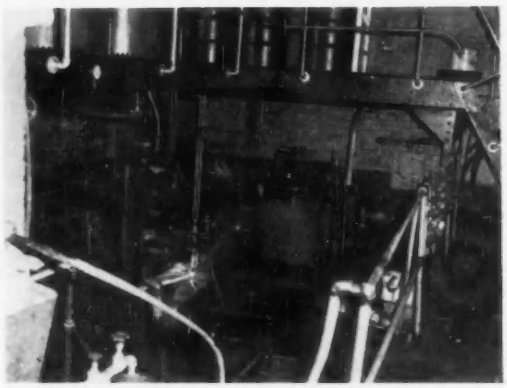
(*Concluded on Page* 58)

Major Equipment

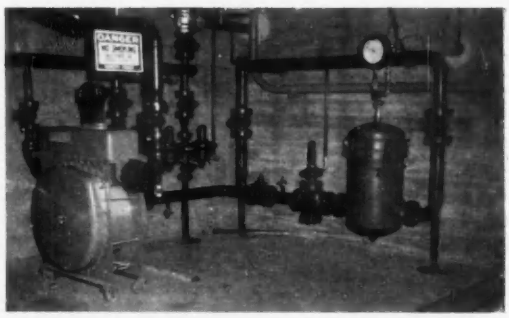
Engine	
Dual-Fuel Engine	Enterprise Engine & Machinery Co. General Metals Corp.
Turbocharger	Elliott Co., Inc.
Governor	Woodward Governor Co.
Control Board	Mullenbach Corp.
Electrical System	
Generator	General Electric Co.
Switchboard	Electric Machinery Mfg. Co.
Electrical Instruments, Meters and Relays	Westinghouse Electric Co.
Water and Lube Oil Pump Motors	U. S. Motors, Inc.
Fuel System	
Fuel Injection Pump	Scintilla Div., Bendix Aviation Corp.
Nozzles & Holders	American Bosch Div. American Bosch Arma Corp.
Fuel Filters	Winslow Engineering Co.
Fuel Oil	Socony Mobile Oil Co., Inc.
Lube Oil System	
Lube Oil Strainers	The Cuno Engineering Corp.
Lubricator	Manzel Div. of Houdaille Industries Inc.
Lube Oil Cooler	E. C. Cooley Co.
Lube Oil Pumps	DeLaval Steam Turbine Co.
Lube Oil Filter	Wm. W. Nugent
Centrifuge	The Sharples Corp.
Lube Oil	Socony Mobil Oil Company, Inc.
Purifier	Hofmann Engineering Co.
Lube Oil Controls	Amot Controls Corp.
Water Cooling System	
Turbocooler	Young Radiator Co.
Water Controls	Amot Controls Corp.
Water Pumps	Gould Pumps, Inc.
Water Cooling Tower	Binks Mfg. Co.
Natural Gas System	
Solenoid Gas Valve	Amot Controls Corp.
Gas Meter	Rockwell Mfg. Co.
Gas Regulators	Fisher Governor Co.
Intake Air System	
Intake Filter & Silencer	Vortox Mfg. Co.
Exhaust Gas System	
Pyrometer	Illinois Testing Laboratories, Inc.
Exhaust Silencer	Maxim Silencer Co.
Liquid Level Gauges	Rochester Mfg. Co., Inc.



Air from blower at left of turbocharger passes through water-cooled turbocooler at lower right before entering the engine.

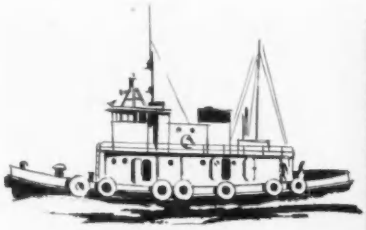


Dirty lube oil from tanks partly visible at upper left goes through centrifuge at lower left and purifier and vaporizer at lower right to three clean oil drums seen at upper right.

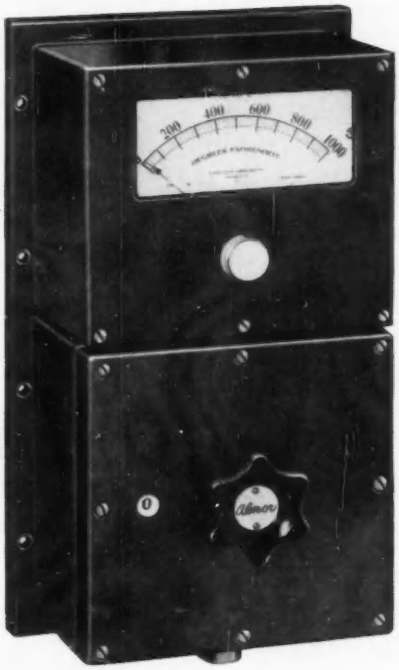


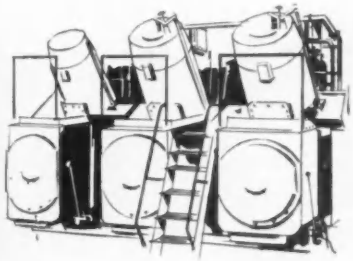
Natural gas is delivered through meter at left at 50-60 psi. Automatic regulators maintain 11 psi gas pressure at engine. Gas is cleaned by the filter at right before entering engine.

Underground piping leads engine cooling water to and from the outside cooling tower at left. Two of four fuel tanks are seen.

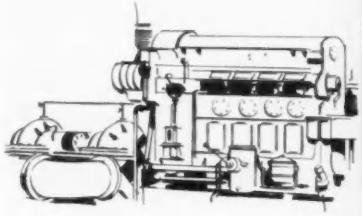


Marine

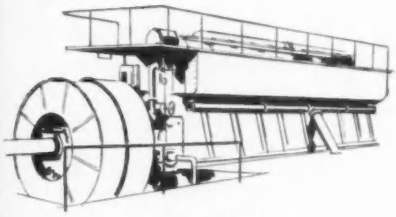




Engine compressor



Pumping



Stationary

GET THE BEST FROM THE POWER YOU BOUGHT...

WITH *Alnor*® PROTECTION

Accurate check of exhaust temperatures with an Alnor Pyrometer system can assure minimum fuel consumption per horsepower and long service from the power you bought—without the interruption of many common-cause breakdowns.

At a fraction of the cost of your present engine maintenance bill, an Alnor system can give you advanced warning of:

CYLINDER OVERLOAD	SCALED JACKETS	DETONATION
PREIGNITION	CLOGGED PORTS	FAULTY INJECTION

Series A Pyrometers are designed specifically for direct mounting on diesel engines or other equipment subject to vibration and rough usage. Readings are accurate to within + or −1%. Dustproof, fumeproof, splashproof. Switch capacities of 4, 6, 8, 10, 12 and 16 circuits. Other models to 31 circuits. Get full information—by return mail. Send for Bulletin 4361 with complete details of the Pyrometer and thermocouple assembly designed for your engine.

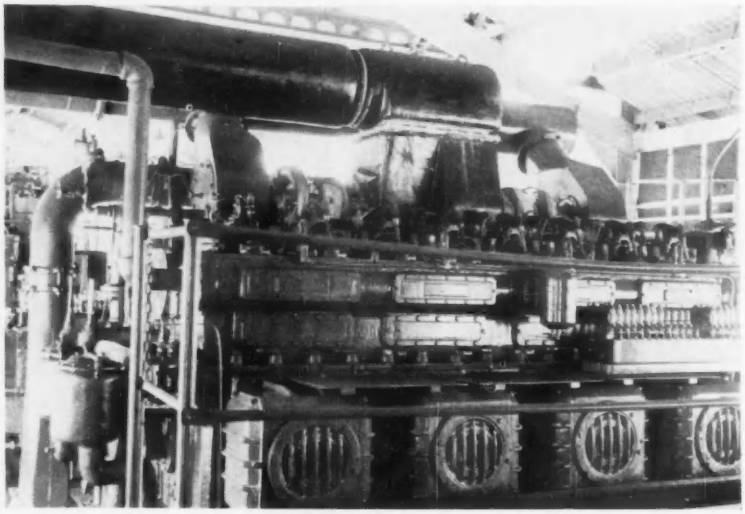
Alnor

write:

ILLINOIS TESTING LABORATORIES, INC.

Room 507, 420 No. LaSalle St., Chicago 10, Illinois

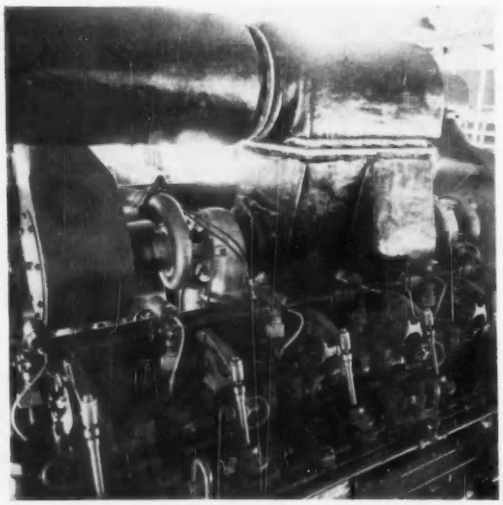
Two turbochargers, mounted directly on exhaust manifold, connect to intake air plenum chambers (outer piping) and to lagged exhaust piping at engine center.



Multiple Small Turbochargers Boost Big Engine Performance

Power boost of up to 16½% is reported after field installation of two production-type turbochargers on engine-compressor pumping natural gas. Other conversions are planned.

Turbocharger mounting is simple and clean. Small size of units permits short, direct piping arrangement and adds practically nothing to overall engine dimensions. Multi-units tend toward greater reliability and cost reduction, particularly in the event that damage should occur to one.



MULTIPLE AiResearch turbochargers are now boosting natural gas engine output. Two Model E-100 turbochargers made by the AiResearch Industrial Div. of the Garrett Corp. have been used to increase the capacity of a Clark MA-8 natural gas engine-driven compressor.

The natural gas engine compressor, operated by the Richfield Oil Corp. at an altitude of 1800 ft in New Cuyama, California, pumps natural gas 24 hours a day. Before turbocharging, it was rated 300 hp at 600 rpm at sea level. After installation of the two E-100 turbochargers, output was increased to a range of 330-350 hp under the existing altitude conditions. In one instance, it ran as high as 367 hp.

The newly turbocharged Clark unit is a 2-cycle, spark ignition engine, using natural gas as fuel. Its eight power cylinders have an 8-in. bore and 8-in. stroke. It is equipped with four compressor cylinders and four scavenging cylinders.

The two E-100 turbochargers are mounted on the engine exhaust in the conventional manner. The turbocharger compressors draw air from outside the building through adequate ducting. This compressed air from the compressor is directed to the engine intake manifold through an AirResearch intercooler. The intercooler reduces the temperature of the air and therefore reduces the thermal level of the engine. The scavenge cylinders are retained in the system to assist in starting and idling.

The net result of the AiResearch multiple-turbocharger installation is that denser air is delivered into the engine enabling it to burn more fuel, therefore increasing its output. Also, exhaust noise level has been reduced to such a degree that the engine mufflers have been removed.

This innovation of multi-turbocharging has opened up a wide market for AiResearch turbochargers.

ENGINEER'S FIELD REPORT

PRODUCT **CHEVRON PRESSURE PRIMER SYSTEM**

FIRM **Bend-Portland Truck Service Portland, Oregon**

Chevron Starting System cuts starter repairs 75%

Chevron Pressure Primer Systems on Bend-Portland Truck Service's 22 diesel tractors last winter cut starter repairs 75%... reduced battery replacements 25%. "We sometimes towed trucks as long as an hour to get them started in cold weather," says fleet superintendent Ed Gutschmidt, "but we haven't towed one since we installed Chevron Pressure Primer Systems. And our generators and voltage regulators last longer, need fewer repairs and adjustments. Altogether, Chevron Pressure Primer Systems save us many hours a year, and hours are dollars."

Driver Gordon Campbell (above) demonstrates how easy it is to start his Kenworth with a Chevron Pressure Primer Cartridge and the discharger mounted on dashboard. Firm previously tried spray-packs, fluid and ether . . . often needed two men to get truck started. Now one man and a cartridge or two does the job even when its 30° below zero.

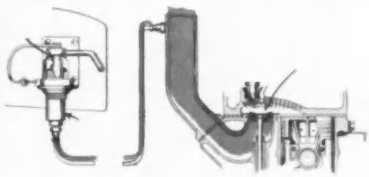
CHEVRON

TRADEMARK "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

Firm's Trucks, all powered with Cummins diesels, range from new to 10 years old. Controlled charge of Chevron Pressure Primer System starts them all safely without knock or ping.

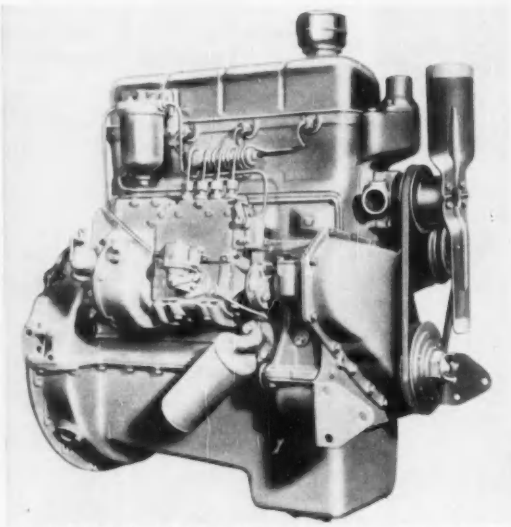
Why Chevron Pressure Primer System assures fast starts



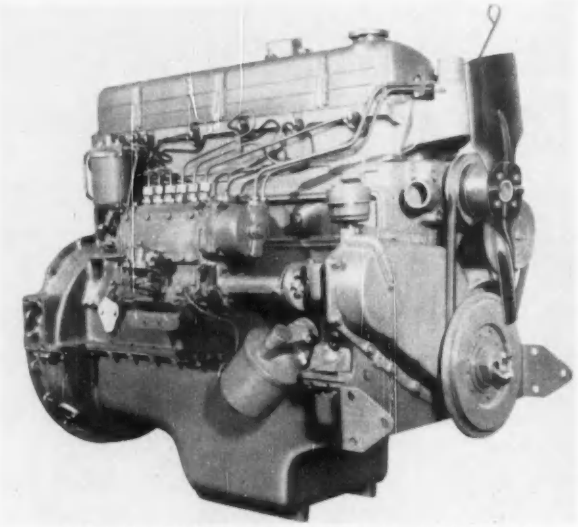
- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even down to -65°F. No hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized, steel cartridges protect priming fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies below.

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado



Series "220" Model X Ford industrial diesel engine is a 4-cyl unit rated 61 hp at 2250 rpm. Its dry weight is about 690 lb.



Series "330" Model Y Ford industrial diesel engine is a 6-cyl unit rated 96 hp at 2250 rpm. Its dry weight is about 880 lb.

Second Model For Ford's Industrial Diesel Line

Six cylinder version of Ford's "200" industrial engine is now available. Major features of both models are discussed.

FORD'S Series "220" Model X industrial diesel engine now has a big brother. It's the Series "330" Model Y. Both engines are sold and serviced through the existing network of Ford industrial engine dealers and distributors. They're Ford's twin weapons for invasion of the industrial diesel field.

We say "twin" because, except for the difference in number of cylinders, the engines are practically indentical and many parts are interchangeable. This is a very desirable feature in any line of engines — especially when the engine parts are time-proven. This is evident by the excellent performance being given by the Series "220", the first Ford diesel in the field.

Ford's latest, the 4-cycle "330" engine, has six cylinders, two more than the "220" unit. The 6-cyl engine rating is 96 hp at 2250 rpm as compared with the 4-cyl model rating of 61 hp at the same speed. Continuous horsepower ratings are 77 hp for the larger unit and 49 for the smaller, both at 2250 rpm. Torque rating for the Model Y is 236 lb ft at 1500 rpm, for the Model X, 152 lb ft at 1600 rpm.

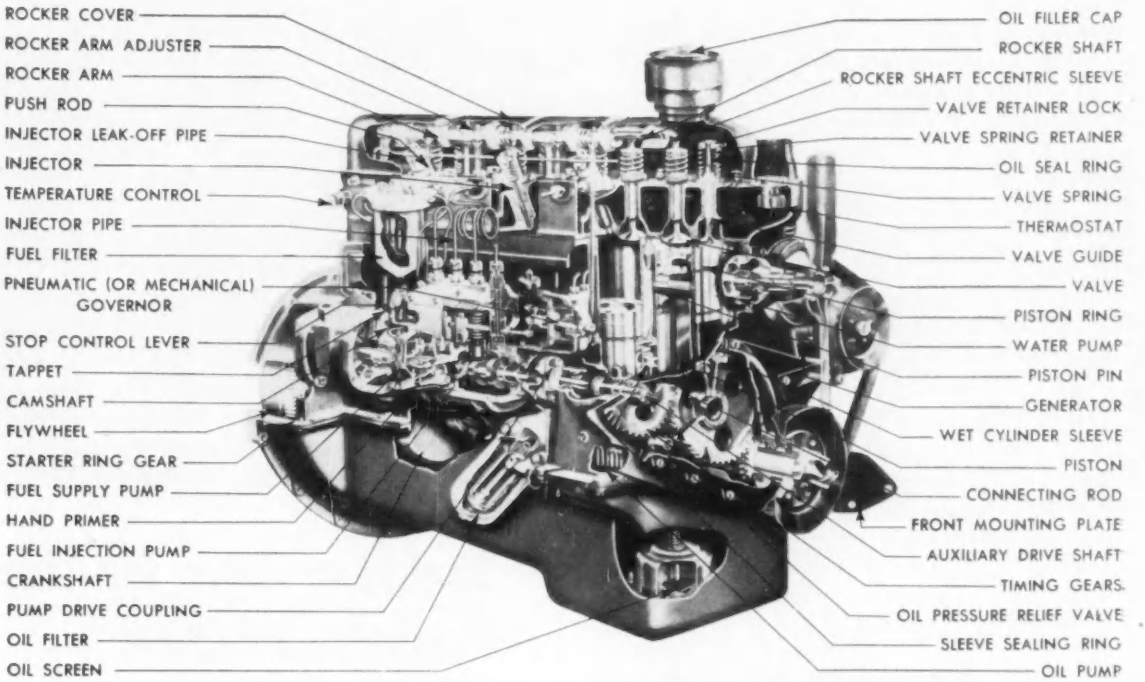
Both continuous horsepower and torque ratings are based on 80% of the maximum ratings. The maximum horsepower and torque ratings are for complete engine assemblies including water pump and generators but less fan. This is the power and torque obtained when operating at standard sea-level atmospheric pressure of 29.92-in. of mercury and standard air temperature of 60°F.

Since both units have a 3.94 by 4.52-in. bore and stroke, cu. in. displacement of the 4-cyl engine is 220, for the 6-cyl unit, 330 — hence their series designations.

Engine Features

The cutaway shows that the engines are conventional in general arrangement. It also shows details of the various components that contribute to the good performance and durability of the engines.

The open-type combustion chamber is so designed, for example, that its shape gives good turbulence. This plus good fuel distribution throughout the combustion space from a Simms injection system gives thorough mixing of



Details of various engine components can be seen in this cut-away of the 4-cyl Model X Ford diesel. Note the dished-out crown of the piston which forms lower part of the open-type combustion chamber. Engines are conventional in general arrangement.

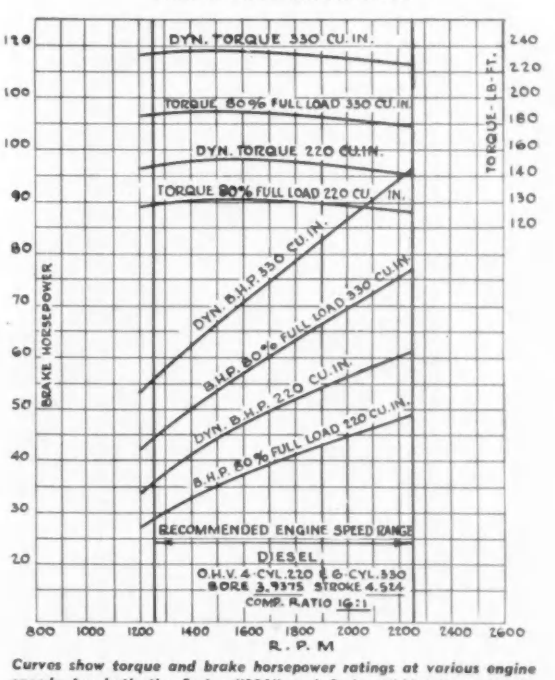
fuel with air. The result is clean combustion with good fuel economy. Fuel consumption through most of the operating speed range is 0.420 per bhp hr, increasing to 0.435 at maximum speed.

Fuel is injected into the combustion chamber through an injector with four 0.010-in. orifices. Most of this combustion chamber volume is in the dished-out crown of the piston. A portion of the piston's rim has close clearance with the cylinder head at TDC and thus provides a squish action to promote turbulence.

This lightweight piston is made of aluminum alloy to give rapid heat transfer. It has a low expansion factor. It is tin plated to reduce possibility of cylinder wall cuffing. Three compression and two oil rings give good sealing and lube oil control.

Rotating exhaust valves help in maintaining good cylinder pressure sealing. These free-turn type valves are designed to rotate each time the valve opens and closes. This promotes even wear, extended life and better cylinder sealing for longer periods of time. High tungsten, chrome alloy steel exhaust valve seat inserts are easily replaceable when neccessary.

Other engine components are also engineered with an eye toward both operating performance and ease of servicing. Easily-replaceable wet cylinder sleeves are used. Crankshafts are balanced statically and dynamically for smooth operation. Large contact surface on main and conrod bearings mean reduced load and longer life.



Curves show torque and brake horsepower ratings at various engine speeds for both the Series "220" and Series "330" Ford diesels.

Combustion chamber design combined with the engine's 16 to 1 compression ratio helps to give fast starting even in cold weather. Further aid in cold-weather starts is obtained through the high cranking speeds obtained from a 12-v starting system

Accessories

With the suitable accessories available, Ford engines can be used in a wide range of applications. For example, you can get an SAE No. 3 or 4 heavy-duty housing to attach to the engine flywheel housing. The SAE housings have foot mountings and are adaptable to many standard drives.

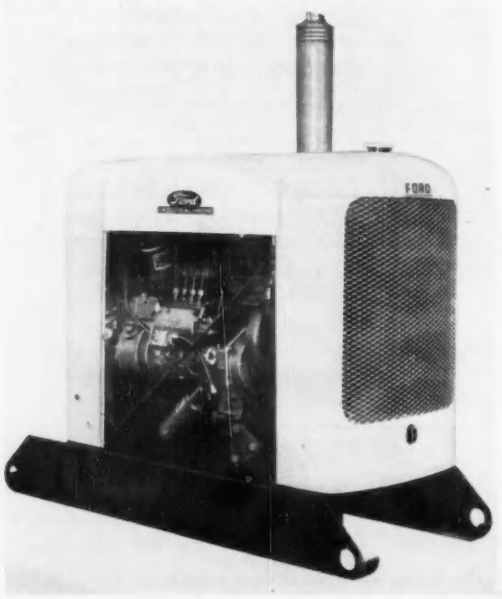
For attachment to the housings there are two power take-offs and one truck-type transmission available. One heavy-duty PTO unit has an over-center clutch. It also has large opposed-tapered roller bearings for radial and thrust loads. The other PTO unit has a spring-type clutch.

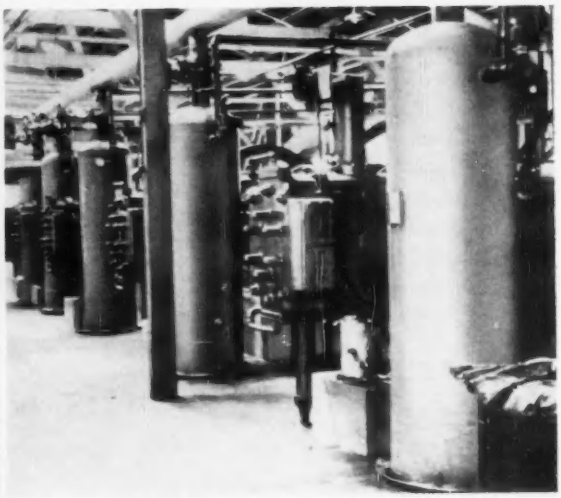
The heavy-duty truck-type transmission is available with three or four speeds and is adaptable for a variety of applications.

Summary

The Series "220" engine has already proven itself in the field by its good performance, economy and durability in many applications. The Series "330" is expected to do the same. Quick delivery of parts and servicing are also obtained from the existing network of Ford industrial engine dealers and distributors all over the country. All these factors add up to many advantages for the owners of Ford units.

Typical Model X Series "220" skid-mounted power unit. Both models of Ford's industrial units can be fitted with various types of accessories and can be adapted to many applications.





Snubbers Solve Air Line Pulsation Problem

GAS pulsation can be damaging and costly. A problem involving gas pulsation which caused many pipeline breaks for 15 years was finally solved by Burgess-Manning Co. engineers.

The problem occurred on a compressed air pipeline installation using four Cooper-Bessemer horizontal gas engines with integral air compressor cylinders. These were installed in the early 1940's by the Liberty Glass Company of Sapulpa, Oklahoma. The units included three single-cylinder air compressors with 14¾ by 20-in. cylinders, double-acting and one 2-cyl air compressor with 14¾ by 20-in., double-acting cylinders.

Pulsation existed from the first day of operation. Numerous pipeline breaks occurred due to mechanical fatigue caused by the pulsation. Several corrective measures such as bracing and expansion joints were tried. But, pulsation being a fluid problem within the pipe system, none of these measures were effective.

In late 1956, the Liberty Glass Company consulted the Burgess-Manning Company of Libertyville, Illinois, and Dallas, Texas. They had to find a solution to this pulse problem. Burgess-Manning engineers designed snubbers to satisfy the specific need of this installation. These snubbers were installed in the lateral piping on the discharge of each cylinder. They did the job. Pulsation was reduced to a minimum and vibration in the discharge headers and aftercoolers was effectively eliminated.

The Burgess-Manning pulsation snubbers can be seen in the accompanying photograph.

3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.

DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY

You Should Protect Your Engine

Cost of protective devices to warn against abnormal conditions is cheap insurance against costly engine repairs and downtime.

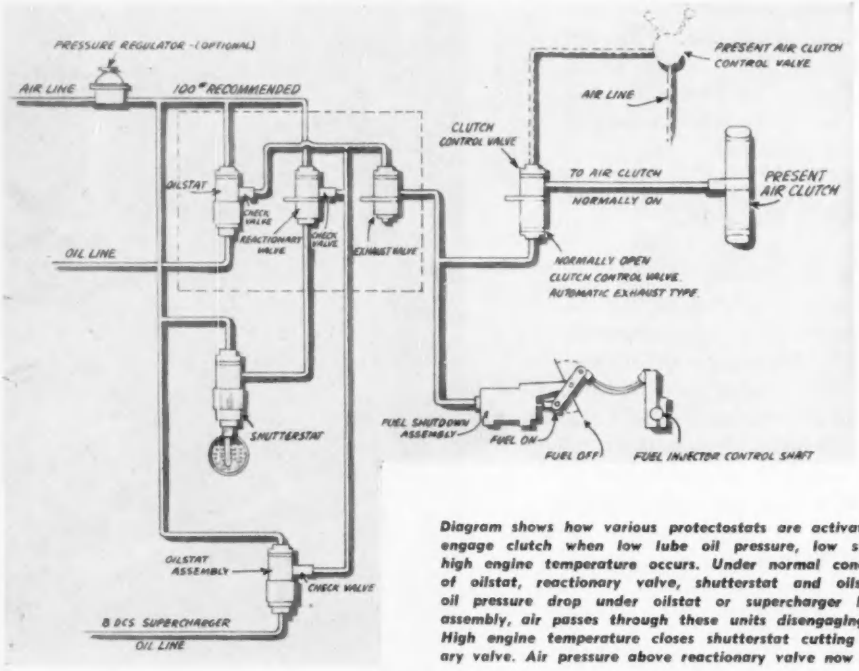
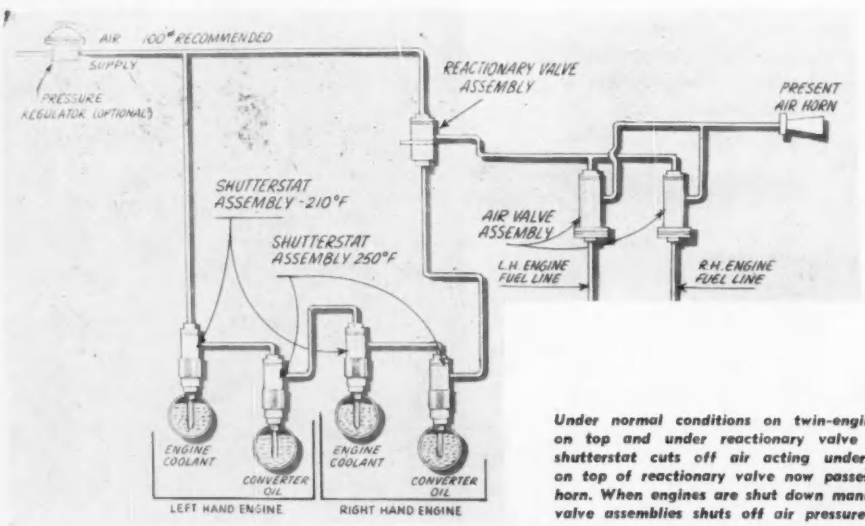


Diagram shows how various protectostats are activated to dethrottle engine and disengage clutch when low lube oil pressure, low supercharger line pressure and/or high engine temperature occurs. Under normal conditions, air pressure acts on top of oilstat, reactionary valve, shutterstat and oilstat assembly. If there is lube oil pressure drop under oilstat or supercharger line pressure drop under oilstat assembly, air passes through these units disengaging clutch and dethrottling engine. High engine temperature closes shutterstat cutting off air pressure under reactionary valve. Air pressure above reactionary valve now passes through activating system.



Under normal conditions on twin-engine installation, air pressure acts on top and under reactionary valve assembly. At high temperature, shutterstat cuts off air acting under reactionary valve. Air pressure on top of reactionary valve now passes through air valve assemblies to horn. When engines are shut down manually, fuel pressure drop under air valve assemblies shuts off air pressure at these points and stops horn.

ONE of several engines compounded together through air clutches failed. These units were driving an oil drill rig. When one failed, the remaining units motorized it. The result—serious damage.

The cause of engine failure may have been simple, requiring only minor repairs. But since the units didn't have any protective devices, the abnormal condition was not caught in time. The result—costly repairs. If these units had the protective devices they now have, the air clutch to the engine in trouble would have been disengaged automatically and no harm done.

By proper planning, costly engine damage need not happen. Simple and inexpensive devices are available to prevent engine damage due to various abnormal conditions. These protective devices can be selected to do anything from giving a warning, to starting or stopping a unit. Generally, individual engine protection requirements are varied. This requires that a combination of protective devices be tailored to suit engine needs.

One company that specializes in control devices which in combination give protection against various abnormal conditions is the Kysor Heater Co. Their "Protectostats," as they are called, are either sensitive to pressure or temperature, the major indices of engine functions.

The sensing end of pressure units are responsive to pneumatic or hydraulic pressures. Temperature-sensitive units monitor water and oil temperatures. They can be selected to operate at any standard pressure or temperature range desired. All units are built for controlling a pneumatic system. They control valves in the pneumatic system which check or pass air under pressure to work various devices.

The protectostat systems are triggered entirely by air pressure. Kysor engineers feel that air pressure has a more positive power-punch and is not prone to failures such as caused by corrosion.

The accompanying diagrams show how some of the Kysor controls available are hooked up in typical arrangements. These controls can be obtained in a panel assembly which permits protection against any combination of abnormal conditions which may occur on an engine. For example, if you want to do any one or combination of the following automatically—

Dethrottle engine
Disengage plate clutch
Sound alarm whistle
Ground magneto
Shut off fuel
Disengage air clutch
Blow air horn

when one or more of the following conditions occur—

Low lube oil pressure
High engine temperature
Low Supercharge line pressure
High converter oil temperature

a panel assembly containing the control devices to meet your requirements is available. A protectostat assembly can be obtained, for example, which would dethrottle engine, sound alarm whistle and disengage air clutch—when—low lube oil pressure and/or high engine temperature occur.

Trucker Uses Scientific Methods To Better Already Good Performance

IN a new laboratory at their Oakland Shop, PIE will diagnose engine health and end needless and expensive maintenance bills.

Two major problems that overshadow the best maintenance efforts will be reduced—over-maintenance which results in wasted materials and labor costs; and under-maintenance which is felt in road failures and delays. A new part will be installed only when lab tests show excessive wear through high metal concentration.

Danger signs invisible to the human eye but uncovered through scientific analysis will enable shop personnel to repair engines before major damage is done. Engine oil will be replaced only when tests show that it has lost its lubricating ability. Further savings are expected by detecting other faults such as leaks from radiator and fuel tanks which might escape visual inspection.

At present, the state and composition of lube oil removed at 15,000-mile intervals from each of Pacific Intermountain Express' 800 line haul units are being checked. Under proper analysis, the oil test will show if abnormal wear is taking place, and where.

A direct-reader Spectrometer, which takes up an entire room, can tell metal concentration in the oil, and that's the danger signal when it comes to engine wear. Each part of the engine is composed of a different alloy bearing, an unmistakable characteristic in the spectrum. The Spectrometer indicates each element and metal present in the oil and designates its degree of concentration.

Other lube oil tests include: checking for amount of dirt; viscosity and acidity.

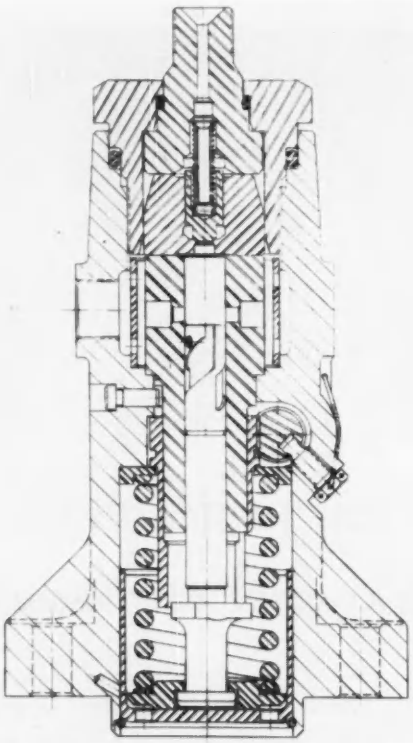


Fig. 1. American Bosch's APFICQ injection pump. Note absence of delivery valve gasket and use of plunger-spill baffle ring to replace former plunger-spill baffle screw.

Injection Pump Improvements Pace Engine Development

Today's high engine outputs, higher speeds, increasing use of heavier fuels and similar factors make new demands on fuel injection equipment. Design improvements in injection pumps are making modern engine performance possible while providing long service under the severe operational demands.

LET'S look at some effects that high engine output has on a fuel injection pump. We'll set them down in simple, logical order.

higher hp per cyl	= more fuel delivery per stroke
higher rpm's	= less time to deliver more fuel
higher compression	= higher pressure for good penetration
heavier fuel	= more pressure for delivery
Answer	= higher internal pump pressures and velocities

Q.E.D.

All this adds up to accelerated erosion of pump parts subjected to the higher velocity oil (it's bad enough in less severe service) and increased physical stress on the whole pump right down to the mounting flange.

Yesterday's pumps can do the job—for a while—but at a sacrifice in service life. This can't be tolerated so you design the pump to stand up under today's conditions. A good example of how this can be done is seen in the newest American Bosch injection pump for locomotive and stationary-type engines.

This pump, the APFICQ, was developed for high-speed high compression engines and to solve the specific problems mentioned. Significant features of this pump (Fig. 1) are elimination of the delivery valve gasket, use of a special plunger-spill baffle ring, and increased strength built into the plunger barrel and pump housing.

Gasketless Delivery Valve

With some early pump designs (see Fig. 2), problems were experienced with erosion of the copper delivery valve gasket when pumps were operated under extreme-duty conditions. Occasionally, within relatively short periods of 500-1000 hours, gaskets eroded excessively to the point where fuel leaked from the high-pressure side of the pump to the fuel supply sump.

In some cases, large pieces of gasket broke away and were carried to the nozzle where nozzle orifice clogging and seat failures were prone to occur. Many possible gasket materials were investigated for use but all failed to resist erosion completely. Samples of excessive gasket erosion are shown in Fig. 3.

Note in Fig. 1 that high injection pressures are sealed completely by lapped surfaces in the newly designed pump. Fuel supply pressure is sealed by O-rings located at positions remote from direct contact with the fuel pulsations.

Observe, too, the easy removal of the delivery valve assembly from the pump. There is no "jamming" of the conventional delivery valve gasket between the pump housing and delivery valve body for sealing the sump supply pressures as in the earlier design pumps. Thus, no threads are needed or provided on the delivery valve body. Also, no special tool (puller) is needed to remove the assembly from the pump during dismantling.

(*Continued on Page* 32)

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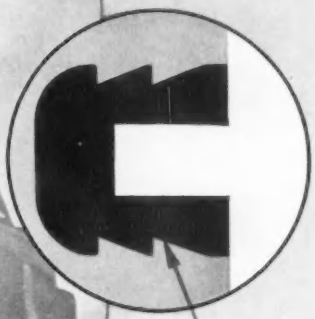

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Injection Pump Improvements

(*Continued from Page 30*)

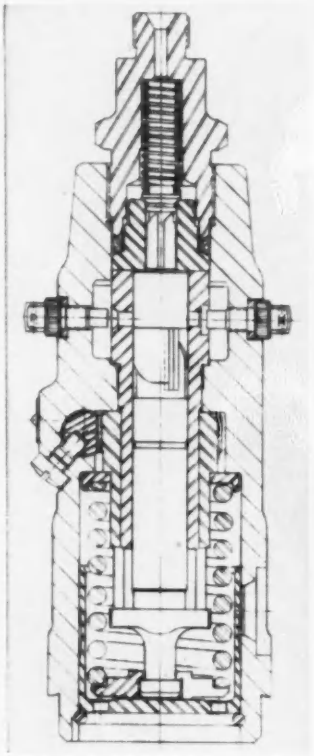


Fig. 2. Older American Bosch injection pump model shows delivery valve copper gasket which is subject to erosion under some extreme-duty conditions. Plunger-spill baffle screw is also seen. Compare design of delivery valve assembly with that in Fig. 1. New delivery valve body is not threaded and no special tool (puller) is needed to remove it from the pump.

Spill Baffle Ring

A hardened-steel baffle ring has eliminated another sometimes-serious erosion problem with this type pump-erosion of the plunger-spill baffle screw. An extreme case of baffle screw erosion as experienced in early type pumps is shown in Fig. 3. This erosion results from the high-pressure pulses occurring when the spill port is opened, relieving the pressure above the plunger.

The baffle ring rotates freely under the influence of vibration and pressure pulsations so that no area is exposed to plunger spill action for any prolonged period of time. With this baffle ring, erosion difficulties here are a problem of the past.

Increased-Strength Plunger Barrel and Pump Housing

Constant demand for increased fuel delivery and ever-increasing injection pressure by the new highly-rated diesel engines has dictated a complete re-evaluation of the strength of all pump parts. This is particularly true of the plunger barrel and pump housing.

The pump can be considered to be working against a fixed orifice (the nozzle). More fuel must be delivered in less time and it may be a higher viscosity fuel. So when the engine's cam pushes the plunger up, the fuel has to move—or else. The "or else" can be anything from a split barrel to a broken mounting flange if the pump can't take it. Pressures developed can be enormous.

Fig. 3. Typical eroded barrel locating (plunger-spill baffle) screws and copper delivery valve gaskets which had to be replaced.

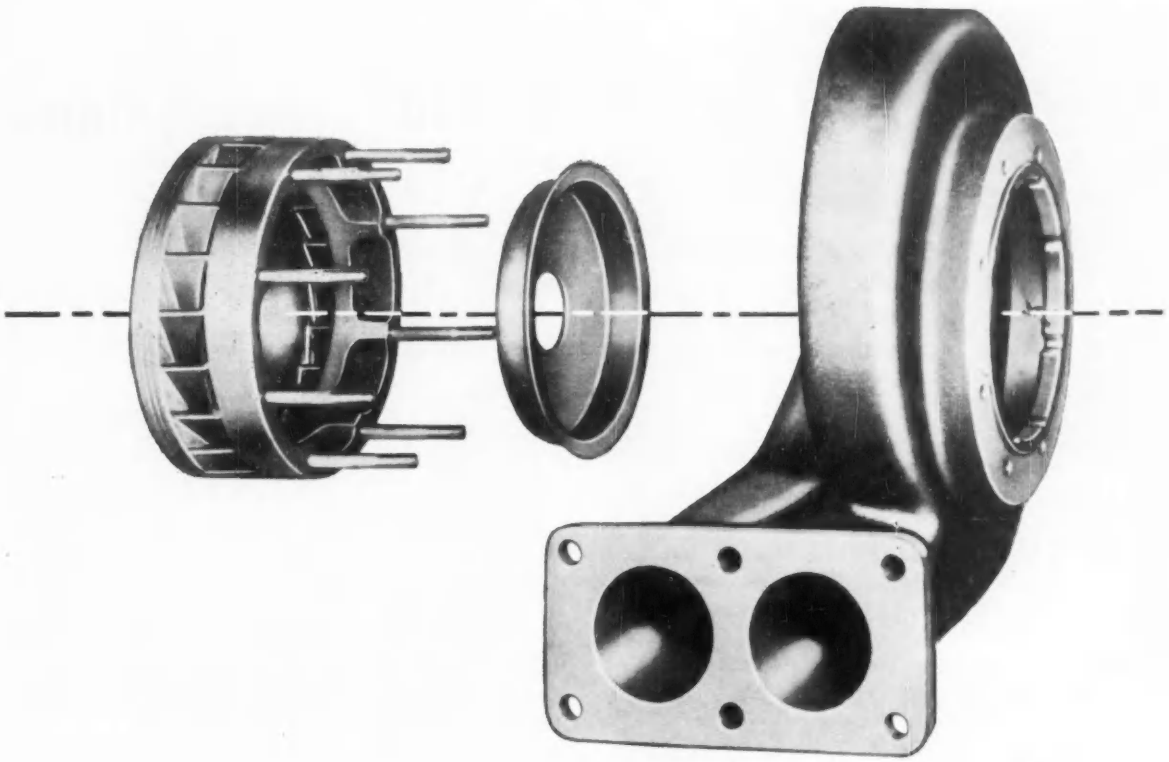
To provide the greatest practical strength, barrel wall thickness was increased at both the head, to withstand higher injection pressures, and the shank to limit fuel bypass leakage to a minimum value allowing for adequate lubrication of the plunger during operation. Pump housing strength and rigidity have been increased by providing a web at each side directly above the mounting flange and four holes in the flange for mounting the pump on the engine.

Conclusion

Modern engines place severe demands on their injection pumps. For good operation and to insure that the pump will not be the weakest link in the chain of service life, today's pumps must incorporate features designed for the operating conditions of today — and tomorrow. It has been shown how American Bosch has approached this problem.

At least one feature contributing to greater service life and elimination of troubles, has also simplified servicing. No more pulling of jammed delivery valve holders. Elimination of gaskets automatically eliminates possibility of gasket reuse, a potential troublemaker, or use of inferior or improper gaskets.

Once, introduction of more lapped fits would have posed both a manufacturing and servicing problem. At the factory, new and modern production machinery, installed as part of American Bosch's extensive modernization program, produces these finishes fast and at no increase in costs. In the field, practically all service shops have mechanical lapping machines to do any refinishing necessary.



Hot parts of diesel turbocharger last longer when made of Ni-Resist

Over 15,000,000 diesel horsepower is supercharged by equipment of the Elliott Company, Jeannette, Pa.

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If you're looking for a cast iron with high stability at 1400°F. temperatures, you'll find it in Ni-Resist. This alloy shows 12 times better resistance to growth than plain iron . . . 10 times better scaling resistance.

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Quick Check For GM "71" & "110" Camshaft Timing

If camshaft timing, controlling valve and injector timing, of Detroit Diesel's "71" and "110" engines is suspected, it can be checked quickly and accurately. This can be done without any major disassembly to inspect gear train markings.

WHEN signs point to GM 71s or 110s being out of time after an overhaul — they can be checked quickly by methods recently introduced by the Detroit Diesel Engine Div. These methods eliminate removing any major part of the engine to check for an improperly assembled gear train. Though the method for each series differs, both are simple and accurate. Here's the procedure for the "71".

Checking Series 71 Engine Timing

1. Remove the cylinder head cover.

2. Select any cylinder for the timing check. A cylinder adjacent to one of the head cover studs is more convenient since the stud may be used for mounting the dial indicator which will be used.

3. Remove injector fuel jumper lines on cylinder selected and install shipping caps on injector fuel fittings. Make sure all valve and injector rocker arms are in the "up" position. Then remove rocker shaft bracket bolts and swing rocker arm assemblies out of the way. Remove injector assembly.

4. Carefully place a 12-in. welding rod on top of piston by passing it through injector hole. With throttle in no-fuel position, bar crankshaft slowly in proper direction of rotation. Stop barring when rod reaches end of its upward travel. Remove welding rod and bar crankshaft opposite to direction of rotation between 1/16 and 1/8 of a turn.

5. Select a dial indicator with 0.001-in. graduations and a spindle movement of at least 1-in. This indicator will be mounted over injector hole. Choose an extension for the indicator spindle long enough to contact piston as it approaches its upper position.

6. Mount indicator over injector hole and tighten clamps sufficiently to hold it rigid. The mounting leg may be threaded into the cover stud, or stud may be removed from cylinder head and the leg threaded into its tapped hold. This depends on length of the rod used in making up mounting attachments. Make sure spindle extension is free in injector hole and travels its full 1-in. movement.

7. Attach a suitable pointer to the crankshaft front cover or engine front end plate as shown in Fig. 1. Pointer should extend over vibration damper, or crankshaft pulley, whichever is used.

8. Bar crankshaft slowly in direction of rotation until hand on dial indicator just stops moving.

9. Bar crankshaft in direction of rotation until indicator hand just starts to move. Reset dial to "0". Continue barring slowly until indicator reading is 0.010-in. then stop turning.

10. Scribe a line on damper (or crankshaft pulley) in line with end of pointer.

11. Bar crankshaft slowly opposite to direction of rotation until hand on dial indicator just stops moving.

12. Bar crankshaft opposite to direction of rotation until indicator hand just starts to move. Reset dial to "0". Continue barring slowly until indicator reading is 0.010-in. then stop turning.

13. Scribe a second line on vibration damper (or crankshaft pulley) in line with end of pointer.

14. Scribe a third line halfway between the first two lines. This is positive TDC. The three scribed lines are shown on the crankshaft pulley in Fig. 1. Remove indicator from engine.

15. Install injector assembly. Swing injector and valve rocker arms into position, install rocker arm brackets and tighten bolts to proper torque. Lash exhaust valves and time injector. Bar engine until exhaust valves are open.

16. Install dial indicator so that its spindle rests on top of injector follower, as seen in Fig. 2. Set dial to "0". Bar crankshaft slowly in direction of rotation until TDC mark on vibration damper or crankshaft pulley lines up with pointer.

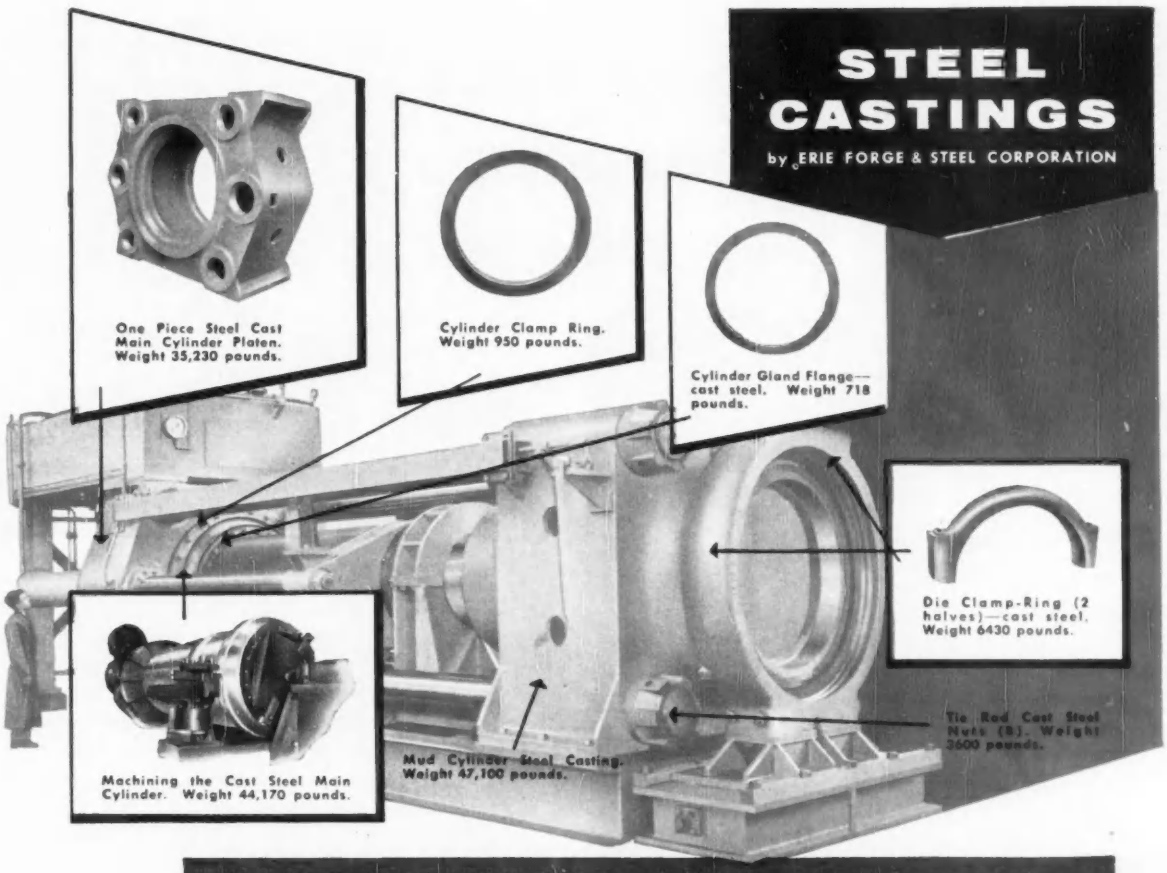
17. Check reading on dial indicator and compare with the following table:

—if indicator reading is 0.223 to 0.233-in. the engine is in time.

—if indicator reading is 0.188 to 0.204-in. timing is one tooth retarded.

—if indicator reading is 0.249 to 0.257-in. timing is one tooth advanced.

(*Continued on Page* 36)


STEEL CASTINGS
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One Piece Steel Cast Main Cylinder Platen. Weight 35,230 pounds.
Cylinder Clamp Ring. Weight 950 pounds.
Cylinder Gland Flange—cast steel. Weight 718 pounds.
Die Clamp-Ring (2 halves)—cast steel. Weight 6430 pounds.
Machining the Cast Steel Main Cylinder. Weight 44,170 pounds.
Mud Cylinder Steel Casting. Weight 47,100 pounds.
Tie Rod Cast Steel Nuts (8). Weight 3600 pounds.

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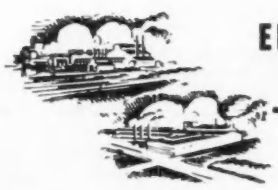
Some 73 tons of steel castings by Erie Forge & Steel Corporation provide the rugged, brute strength built into this 2000 ton Hydraulic Carbon Extrusion Press by Erie Foundry Company in Erie, Pa. Steel castings are made from raw materials to finished product within our plants. The responsibility for the quality and dependability of these components in the finished machine rests squarely upon our shoulders.

Many years of experience in making specification steel components, both cast and forged, for Erie Foundry Company's heavy hydraulic presses and forging hammers suggest that we can serve you in a similar satisfactory and profitable manner. Steel castings and forgings are produced completely here "Under One Responsibility and One Control". Every step in their production from beginning to end is directed and closely followed by our metallurgical quality control and engineering supervision. You may expect a call from your nearest Erie Forge & Steel Corporation field engineer in the near future.



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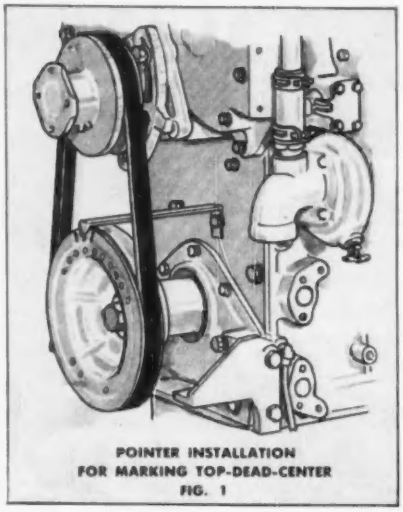
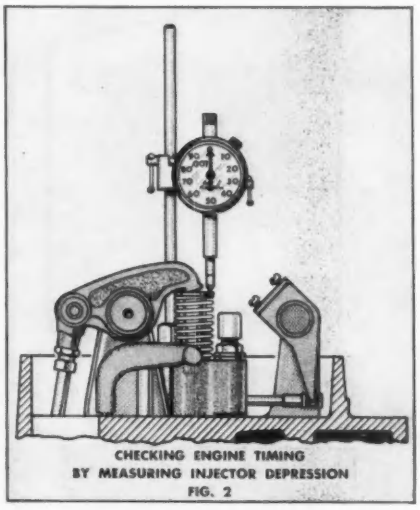


POINTER INSTALLATION
FOR MARKING TOP-DEAD-CENTER
FIG. 1



CHECKING ENGINE TIMING
BY MEASURING INJECTOR DEPRESSION
FIG. 2

GM Camshaft Timing

(*Continued from Page* 34)

After completing timing check, remove dial indicator. Remove shipping caps from injector fuel fittings and install injector fuel jumper lines. Make sure these are tightened to prevent any leaks. Install cylinder head covers. And, remove pointer attached to front of engine.

Checking Series 110 Engine Timing

1. Remove rocker cover.

2. Remove cylinder block hand hole cover where piston movement can be most conveniently observed through liner ports.

3. Make sure injector for cylinder selected is correctly timed.

4. In some cases, it may be necessary to remove the starter for checking flywheel or barring engine. When barring engine in a left-hand rotation don't use the front crankshaft bolt. Use either the barring hole in the flywheel housing or remove starting motor and rotate engine with a bar on the ring gear.

5. Place throttle in no-fuel position. Turn engine in direction of rotation and watch piston movement. When piston just reaches end of upward travel, mark flywheel and flywheel housing so marks oppose each other. If vibration damper is used to indicate end of piston upward travel, mark both damper and engine front cover so marks oppose each other.

6. Continue to turn engine in direction of rotation until piston just starts downward travel. At this point make another mark on flywheel opposite original mark on flywheel housing (or on vibration damper opposite original mark on engine front cover).

7. Place a third mark halfway between the two existing marks on flywheel (or vibration damper). This mark is TDC for the piston being watched.

8. Turn engine opposite to direction of rotation until a few degrees past point where injector follower reaches its top position of travel. Secure a dial indicator on head of cylinder being checked so that its spindle rests on top surface of injector follower. Set-up indicator to use full travel of spindle, then set dial on "0".

Note: On marine units with a raw water pump, disconnect pump to prevent damage to the rubber impeller when the engine is rotated in opposite to direction of rotation.

9. Rotate engine slowly in direction of rotation until TDC marking on flywheel (or damper) lines up with its corresponding mark on flywheel housing (or front cover).

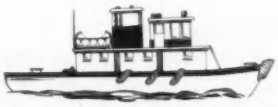
10. Read dial indicator and compare reading with figures in the Injector Depression-Engine Timing Chart shown. If timing is correct, dial indicator reading will be approximately the same as shown under "In Time" in the chart. To determine if timing is advanced or retarded, compare dial indicator reading with figures shown under respective headings. A tolerance of plus or minus 0.010-in. is allowable when using this method to check engine timing.

Conclusion

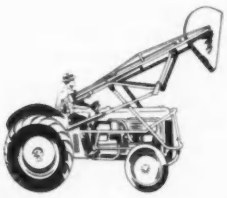
Both of the above timing procedures can be used on the same series of engine—but the applicable readings must be used when checking timing.

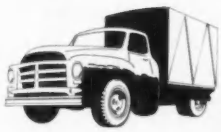
INJECTOR DEPRESSION—ENGINE TIMING CHART

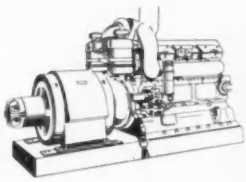
Centrifugal Blower				
In Time	1-Tooth Advanced	2-Teeth Advanced	1-Tooth Retarded	2-Teeth Retarded
0.325-in.	0.354-in.	0.379-in.	0.293-in.	0.260-in.
Roots Blower				
In Time	1-Tooth Advanced	2-Teeth Advanced	1-Tooth Retarded	2-Teeth Retarded
0.322-in.	0.355-in.	0.383-in.	0.282-in.	0.242-in.

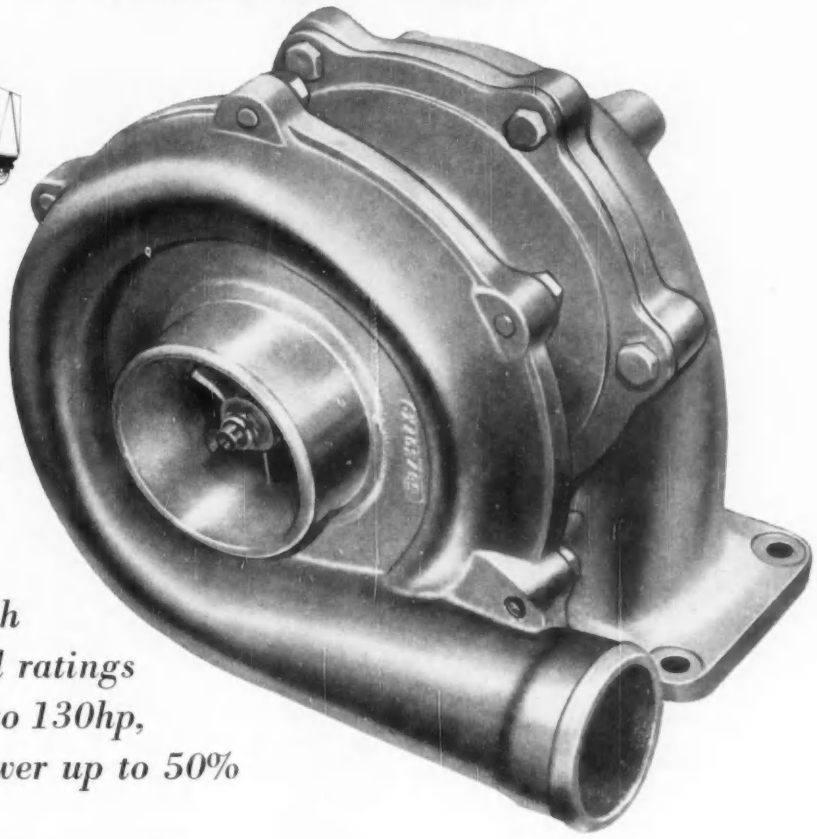


YOUR SMALLER DIESELS CAN BE TURBOCHARGED, TOO ...AT LOW COST!









New AiResearch T-7 turbocharger is designed for diesels with naturally aspirated ratings of from 80hp to 130hp, will increase power up to 50%

A typical AiResearch T-7 installation will give a 900 lb. engine the power of a 1400 lb. engine with greatly reduced specific fuel consumption. It not only increases your payload, but, because it makes your diesel run cooler, it actually extends engine life.

Its low cost, small size, high output and extremely light weight make it the first practical solution to the turbocharging of low horsepower diesels.

Like all AiResearch turbochargers, the T-7 is air-cooled (making no demands on the cooling system of your engine), reduces noise and smoke and maintains sea-level power at high altitudes. Installed on your small diesel, it means smaller initial cost and lower operating costs than those of any naturally aspirated diesel of comparable output.

Your inquiries are invited.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	T-7	T-10	T-14	T-30
Output — lb/min. (Standard Conditions)	15-30	29-51	30-60	50-100
Diameter — in. nom.	8.5	10.0	11.5	15.1
Length — in.	8.5	10.5	12.9	14.7
Weight — lb.	24.0	40.0	95.0	112.0

THE GARRETT CORPORATION

AiResearch Industrial Division

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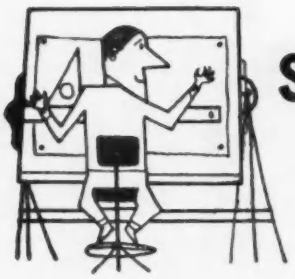


service section

Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you

Corrosion Inhibitors For GM "71"

Corrosion inhibitors coat the metal surfaces within the cooling system with a thin film which prevents the oxygen in the water or in the system from coming in contact with the surfaces and forming rust.

Corrosion inhibitors are generally classified into two types, one known as a chemical and the other a soluble oil type.

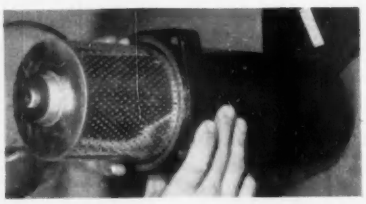
In engines with cast iron blocks and heads, use of either type is permissable. Only soluble oil can be used on units which have aluminum blocks and cast iron heads.

Using Black Light to Detect Fuel Leaks on Cummins Engines

A Magnaflux black light unit is part of the equipment used in "Magnaglow" magnetic inspection of crankshafts and other engine parts. If you have this equipment, you can make additional use of it to trouble-shoot for fuel leaks where inlet connections are screwed into injector bodies and copper sleeves.

The inspection or trouble-shooting procedure is easily accomplished with the engine running. Remove rocker housing covers; provide a hood to shut off daylight from the engine, and check each inlet connection and injector by the light from the black light unit. Fuel leaks will show up as violet or milky-blue color.

You can distinguish fuel oil from lube oil under the "black" (or violet ray) light. Lube oil will appear white, chalky-white, or light grey as contrasted to the violet or bluish color from fuel oil. Leaks are more easily detected immediately after an oil change before lubricating oil has a chance to become diluted.



Alco Element Provides Better Fuel Filtration

One of the biggest news items of the year on fuel filtration for Alco diesels is the introduction of a new secondary fuel filter element. This element, or cartridge, is an advance in design that provides better filtration than the former standard for Alco, and does it for a 70% lower price Modification to filtration equipment is not necessary because the Alco element is interchangeable with the former standard.

The new cartridge, Cat. 2321946, is currently available at all of Alco's renewal parts warehouses.

The excellent performance and low price of the new cartridge can largely be credited to the combined effect of three factors; (1) use of a recently developed, high-quality filtering paper (2) use of inherently strong pleated-type design and (3) use of improved, less expensive manufacturing techniques.

The new paper is an improvement over former papers in that it has added strength, combined with consistent porosity and density. The pleated design does not require the very heavy, hence costly, construction in the non-functional part of the cartridge as did the former standard.

Pleating allows 13% greater area in the new Alco element than in its predecessor. Furthermore, the design of the dies used in stamping the metal portions of the element allows an added saving without sacrificing the sturdiness needed for this service.

Cat Starting Engine Winter Lubricants

Part 2

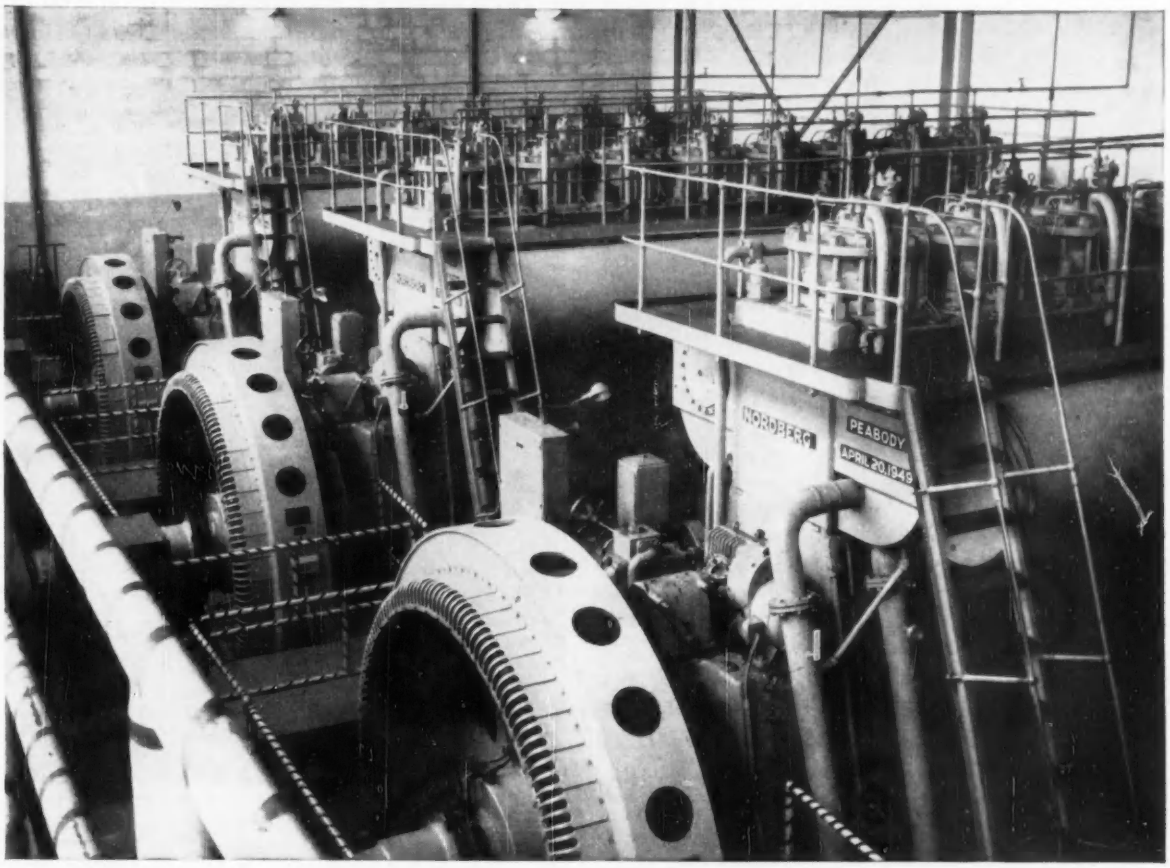
Later 25-hp. 3⅝-in. bore Cat starting engines have a lube oil system that is interconnected with that of the diesel engine. When the diesel engine is operating oil is continually circulating through the starting engine. However, when the starting engine is operating, only the oil that is retained in the starting crankcase is circulated through the starting engine.

If prevailing temperatures make it necessary to dilute the oil in the starting engine with kerosene, dilution must be accomplished after the diesel is shut down. After adding kerosene, start the starting engine to mix the oil and kerosene.

Dilution of the starting engine oil may be required each night if temperatures requiring dilution of the crankcase oil are experienced. This is due to the fact that the diluted starting engine crankcase oil is mixed with the diesel engine crankcase oil as soon as the diesel engine is started. The small amount of kerosene used to dilute the starting engine crankcase oil provides very little dilution of the diesel engine crankcase oil.

Remember that even though the starting engine and diesel engine lubricating systems are interconnected, the starting engine crankcase must be drained and refilled separately at the same time the diesel crankcase is serviced.

Look to **COOK** for Better Rings!

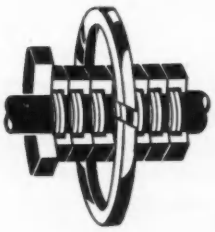


Peabody, Mass. Electric Company Swears by Cook Piston Rings!

Better Performance Since Installation of Cook Rings!

All three of Peabody Electric Company's 3200 H.P. Diesel engines are shown here. In 1956 these engines were required to operate 11,375 hours and generated 19,609,100 kilowatt hours. All three were equipped with Cook Piston Rings and gave trouble-free performance throughout the year.

This record is a tribute to Peabody's excellent management and operating personnel — *and* to the outstanding quality of Cook Piston Rings. If you're looking for a seal with the savings built in, write direct for product information and the name of your nearest representative. Address: C. Lee Cook Company, 946 South 8th Street, Louisville 3, Kentucky.



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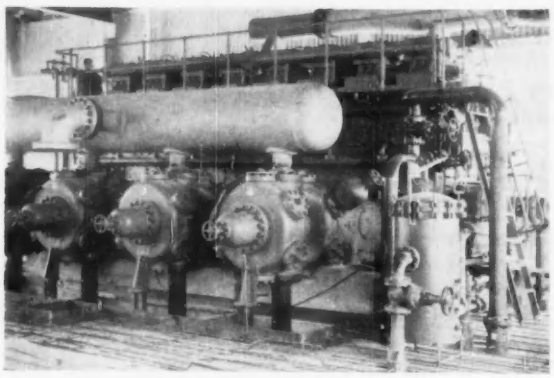
industry news

Diesel-Powered Tractor Fleet Cuts Operating Cost

A diesel-powered tractor fleet has cut its owners operational costs throughout the Midwest and South. The fleet hauls grains, petroleum products, sugar, and general freight for the Wilson Grain & Elevator Co.

Wilson gave diesel power a trial in 1957, by buying 12 White '9000' tractors powered by Cummins JT-6-B Turbodiesels. The new units showed such economies over gasoline-powered units in his fleet that within nine months he had 38 of them.

Records on the diesels show an average of 6.9 mpg of fuel and an overall saving of 12 cents a mile over the gasoline-powered trucks. Overall economies have more than paid for the new units.

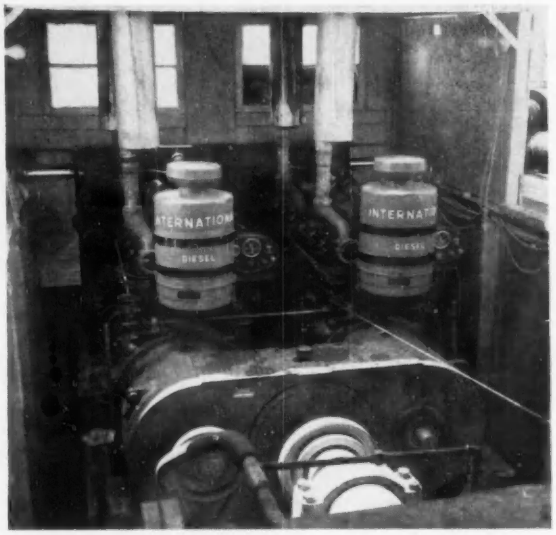


More Gas for Northern Plains

Connected communities in the Northern Plains will now get more gas service. This is due to one of the Worthington SUTC-8 engine compressor units just installed by Northern Natural Gas Company in two of its Kansas stations. They will step up mainline station capacities from 1.19 billion to 1.24 billion cu ft per day.

One 2000-hp Model SUTC-8 will join other Worthingtons at Bushton—increasing the total hp there to 35,200. The other will see service at the Clifton station, boosting its horsepower to 36,100.

Northern's expansion program calls for 85 miles of mainline pipe, 9 new compressor engines and conversion of nine more units at a cost of over $12 million.



Diesel Barge Builds Beach

Sandy silt is drawn from bottom of lake and pumped onto beach at Clear Lake, Calif. New homes, stores, etc., will be built on this area. Most of shoreline properties are now submerged at high lake level.

A 12-in., 6200-gpm Kimball Krogh pump on barge is powered by two International UD-1091 diesels through an Alamo Series 450 twin-drive unit. Suction is through a 12-in. intake linked by flexible hose to a rotating auger. The 36-in. auger loosens silt from bottom of the 15 to 20-ft deep lake. A 12-in. discharge pipe carries 275-cu yd of silt per hour 800 ft to beach.

Diesels use air cleaners used on IH Model 95 Payhaulers and large-capacity radiators. Rpm is 720, to correspond to pump speed. Engine throttles are remotely controlled by single line from operator's panel.

A 30-kw diesel generator supplies power for lighting, and other motor-driven equipment.

new products . . Page 44

people and plants . . . Page 48

new literature . . . . . Page 50

ASME Gas Turbine Conference & Exposition

Shoreham Hotel, Washington, D. C., will be the scene of the third annual ASME Gas Turbine Conference & Exposition. The dates are March 3, 4, 5 and 6, 1958.

A full 4-day technical program will cover papers relating to the latest domestic and foreign developments on design, application and operation of gas turbines.

One of the highlights will be a display of operational gas turbines at the Naval Gun Factory.

Displays from 26 organizations from both here and abroad will also create considerable interest.

Gulf Oil Corp. to Expand

Gulf Oil Corp. has announced a planned capital outlay of $564,000,000 in 1958 for itself and its consolidated subsidiaries. This will be the highest in the company's 56-year history.

The money will go for expansion and improvement of production, refining, transportation and marketing facilities. Practically all of it will be spent in the Western Hemisphere.

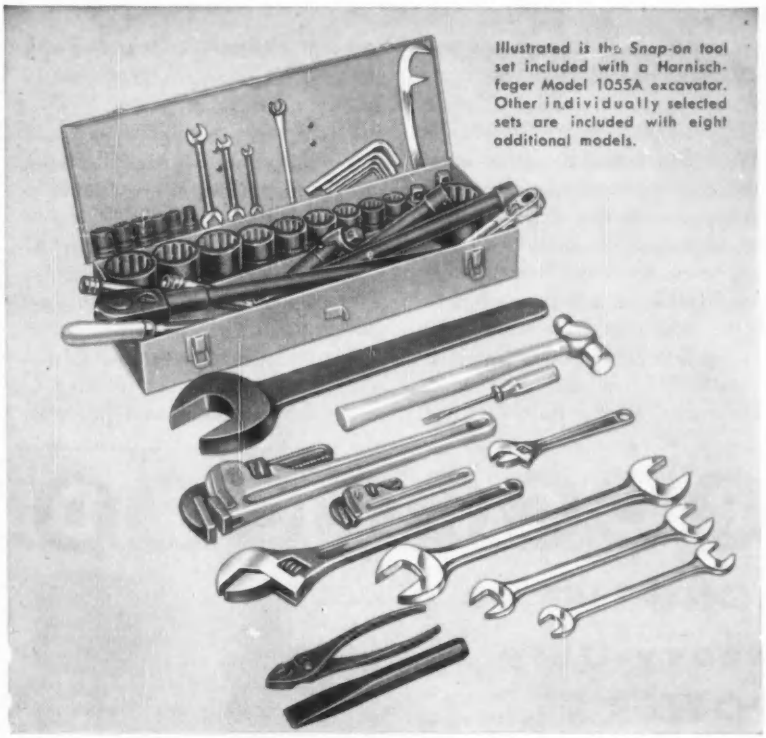
Plus this, Gulf and its consolidated subsidiaries plan to spend $128,000,000 in geophysical exploration, wildcat drilling and other activities necessary to the discovery of new oil reserves. Of this sum, nearly three-fourths of the total will be spent in the United States.

Pennsy RR to Lease Diesels

Pennsylvania Railroad will lease 225 diesel locomotives. They will lease 175 from a new leasing subsidiary of General Motors, Elmo Corp., for an initial term of 15 years. Alco Products will supply Pennsy with 50 more.

Value of the locomotives Pennsy is leasing under the two arrangements is estimated at $$33,750,000. Average horsepower of each locomotive is 1500 and cost of such units is about $100 per horsepower.

G. M.'s Electro-Motive division, LaGrange, Ill., has already started delivering these new locomotives to the Pennsy.



Illustrated is the *Snap-on* tool set included with a Harnischfeger Model 1055A excavator. Other individually selected sets are included with eight additional models.

Snap-on lives with an excavator

HARNISCHFEGER provides a hand-picked tool kit

Each *Snap-on* tool kit Harnischfeger Corporation includes with a new excavator is specifically designed for that particular model.

These tool sets are the result of an analysis suggested by R. J. Ripple, *Snap-on* sales engineer. After preliminary discussions, Ripple brought in a wide selection of *Snap-on* open-end wrenches, sockets, Torqometers and other tools. Then, working from the ground up during assembly of an excavator, this *Snap-on* specialist, together with Harnischfeger erection and engineering people, selected by actual trial the proper tools to go with the machine.

The complete survey involved at least eight different models and extended over a period of many weeks.

These tool sets make maintenance jobs faster, easier, and better. In addition, factory engineers now carry only a minimum of extra tools for erecting excavators in the field.

GOT A TOOL PROBLEM? CALL THE *SNAP-ON* REPRESENTATIVE

Tool kits for original equipment, tools for production and maintenance, tools for field service work—whatever the problem, talk it over with your *Snap-on* man. He is a specialist who devotes all of his time to industrial application of nationally accepted *Snap-on* tools. Branch offices and warehouses are located in 54 cities throughout the U.S. and Canada. Consult your phone directory or write us.

SNAP-ON TOOLS CORPORATION

8064-B 28th Ave., Kenosha, Wis.

*Snap-on is the trademark of Snap-on Tools Corp.

industry news

Trend To Truck Dieselization

Truck fleet management and operators show a growing preference for diesel power in heavy duty operations, reports C. R. Boll, vice president—sales, Cummins Engine Company, Inc. He cited shipment figures for the first nine months of 1957 showing that diesel power increased to nearly 20% of the total heavy-duty truck (19,500 lb GVW and over) shipments. This compares with 18% for the corresponding period in 1956.

Factors contributing to increased use of diesel power, Mr. Boll said, are greater emphasis on reduction of operating costs, need for higher horsepower engines and modern design which allows diesels to be placed in chassis comparable in size to gasoline chassis.

Continuation of this trend to dieselization in heavy-duty trucking is expected by Cummins and they plan to meet the growing needs with new models to maintain its share of the market. For the last six years Cummins engines have powered over 50% of the diesel trucks on U.S. highways. Cummins sales for the first nine months of 1957 were up more than 8% over the same period last year, Mr. Boll also reported.

ALCO Diesels Go to Sumatra

ALCO Products, Inc. has completed shipment of five diesels for pipeline pumping and power generation in crude-oil operations on Sumatra, Indonesia. The order totaled more than $550,000.

Three 16-cyl, 2400-hp vee-type Model 251 engines are equipped with generators to form diesel-electric packages for power service. The two pumping engines produce 2040 hp at 1000 rpm and the generating-set engines develop 1840 hp at 900 rpm.

Sales Reported by Fairbanks

Sales of 19 units have been reported by Fairbanks, Morse & Company. Orders ranged widely in size and type. One Model 45B3⅛, 5¼-hp diesel generating set was sold to Utah & Arizona Television Station. Four Model 49 NBFU-approved diesels were bought by Austin Company, Seattle.

Big engines ordered included, among others, two Model 38D8-⅛, 10-cyl, 1600-hp diesel generating sets purchased by Bethlehem Steel Company, Quincy, Mass. Two 10-cyl, Model 38F5¼, 750-hp basic stationary diesels will go to Southern Bell Telephone & Telegraph Co., Jackson, Miss., and one 6-cyl, 960-hp Model 38D8-⅛ marine diesel was bought by National Steel & Shipbuilding Corp., San Diego.

Cummins Changes Engine Model Designation

Cummins' heavy-duty trucking engine, the Model HF-6-B, rated 180 hp at 2100 rpm has now been designated the Model NH-180. This is a logical change since the new unit incorporates all the proven major components of the 200-335-hp NH series. (See article in January 1958 issue of Diesel Power.)

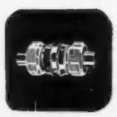
ROCKFORD

LONG LIFE Heavy-Duty POWER TAKE-OFF

40,000 HOUR MAIN BEARINGS

Small Spring Loaded

Heavy Duty Spring Loaded


Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

Speed Reducers

The Timken main bearings in this new ROCKFORD Oil Field type POWER TAKE-OFF are calculated on the basis of 40,000 hours (5-10 Bearing Factor). These bearings are of ample size and capacity to give good service for the life of the engine with which this take-off is used. Your equipment will benefit from the long-life factor of this ROCKFORD extra Heavy-Duty POWER TAKE-OFF.

SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER
1301 Eighteenth Ave., Rockford, Ill., U.S.A.
Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

industry news

Powerhouse at Powerama

At the recent Air Force Powerama Show held in Washington, D.C., the P & H Diesel Engine Division of Harnischfeger Corporation had an effective display of their lightweight P & H diesel and generator combination.

To demonstrate the weight reduction of this new product, Harnischfeger engineers suspended the entire engine-generator unit from a 5000-lb capacity Dillon scale. This graphically illustrated the equipment is well within government specifications for total weight limit covering 60-kw operating at 1800 rpm. It also served as a good illustration of an accurate suspension scale.

ASME Lubrication Symposium

Practical questions concerning the role of viscosity in lubrication will be discussed at a 2-day Symposium sponsored by the Lubrication Div. of the ASME, March 10 and 11th. It will be held at the Socony Mobil training center on the second floor of 150 East 42nd St., N.Y.C. Meetings will run from 9:30 AM to 5:00 PM.

Subjects covered will include, sensitivity of machines to viscosity change and criterion used in selecting viscosity of the oil for machine parts.

Long Pipeline On Stream In Latin America

Longest 20-in. diameter crude oil pipeline in Latin America opened a 210-mile artery from Barinas to El Palito, Venezuela. It brings into production the Silvestre field discovered by Socony Mobile in 1947.

The pump station there is powered by three ALCO turbocharged, dual-fuel engines. Each generates 2000 hp and uses crude oil from the line for fuel. Current capacity is 100,000 bbl daily, with a potential of 150,000 bbl.

Dr. James A. Tong, president of Socony Mobil de Venezuela, said the pipeline would contribute greatly to economic development of the country in general and particularly of the five states through which it passes.

PM Courses For Southwestern Contractors

Texas A&M's Engineering Extension Service at the request of the Texas Highway-Heavy Branch of the Association of General Contractors is now conducting courses in preventive maintenance of earthmoving equipment.

Contractors pay a small fee for each student and, boy, does it pay off. Five-day courses cover all makes of the principal types of equipment. One idea that is pounded into the student's head is the matter of costs. With a good realization of costs of parts, components and complete machines, personnel is more apt to operate it correctly and take better care of it. Importance of keeping records is also stressed.

Result — greater availability of equipment at lower cost.

(*Continued on Page* 55)

lower initial cost
lower service cost
Compare and you will see the ROOSA MASTER fuel injection pump costs less. Use it and you will see that your service costs less. There are fewer parts to service and repair because of the unique design of ROOSA MASTER. It takes less space on your engine, and weighs less than 10 pounds. Even though small in size and light in weight one size serves either a 2, 3, 4, 6 or 8 cylinder engine.
HMS
ROOSA MASTER
makes good diesels better
HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
DIVISION OF STANDARD SCREW COMPANY
The result of 17 years of engineering development is proven in hours and miles of outstanding performance.
Member
YOU CAN DEPEND ON THE DIESEL THAT DEPENDS ON ROOSA MASTER

new products

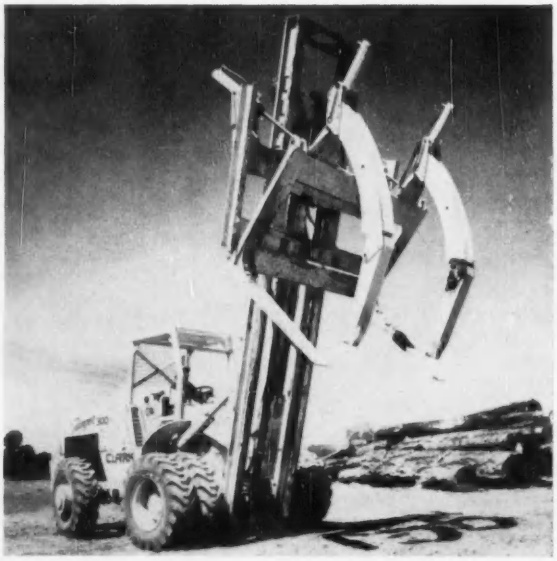
Turbocharger For Small Diesels

Output of 80-130-hp diesels can be economically boosted to that of engines twice their weight with the aid of the latest model AiResearch turbocharger.

The T-7 turbocharging unit was designed specifically for small diesels by The Garrett Corporation's AiResearch Industrial Div.

This newest member of the AiResearch turbocharger family weighs but 24 lb and measures 8½-in. in length and diameter. Under normal conditions it can feed 15 to 30 lb of air per minute into diesel engine cylinders. Since AiResearch turbochargers are air cooled, no complicated plumbing is necessary for installation.

In addition to increased horsepower ratings at sea level and high altitudes, other benefits gained are lower specific fuel consumption, cooler operating engine, less noise and almost complete elimination of exhaust smoke.

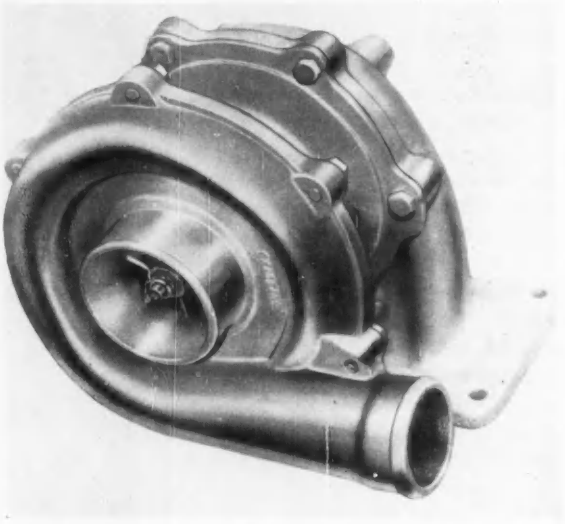


Aluminum Body for Mack Dump Truck

This huge Mack dump truck contains the largest aluminum body ever built for a dump truck. The body has a 37½-cu yd capacity. The truck is 30-ft, 3-in. long, 12-ft, 4-in. wide, 11-ft, 11-in. high and weighs 54,000 lbs.

It was built for the Aluminum Company of America who will use it in bauxite mining operations in the Dominican Republic.

The vehicle is one of several models of large off-highway type trucks made by Mack for use in mining and construction work throughout the world. It is powered by a 335-hp turbocharged diesel engine, and can carry a 67,000-lb load.

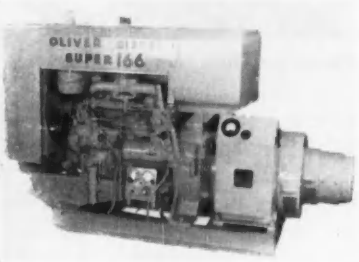


Fork Truck Totes Logs Over Tough Terrain

This Ranger 300 Logger will lift and lug 30,000 lb of logs over mud, snow, sand—any rough territory. Made by Clark Equipment Company, the unit is available with either a GM diesel of 283.7-cu in. displacement or a Hercules gas engine of 501-cu in. displacement. A Clark torque converter multiplies engine torque up to 300%.

The machine has 4-wheel drive, power brakes, power steering and power shift with 4-speed transmission. Differential locking device prevents wheel slippage. The Ranger 300 will travel 25 mph both forward and reverse and has a loaded lift speed of 28 fpm.

Log handling is done with 30-deg tilting forks on bottom and two hydraulically operated arms or clamps on top. Forks, 72-in. long, can be moved laterally more-than nine feet for extra long logs. The clamping device can be tilted 44 deg forward for pick up or dumping loads.



New Power and Light Plant

Norseman Marine, Oshkosh, Wis. has added a new 15-kw diesel power and light plant to its line.

The new series ND15 is driven by a 4-cyl Oliver diesel. The engine is equipped with instrument panel, air cleaner, oil filter, muffler, and 12-v starting system.

Generators on these models are of the revolving-field type with directly-connected exciter. The generators are directly-coupled to the engine and aligned on a common rigid-steel sub-base. All generators are equipped with automatic voltage regulator, rheostat and voltmeter.

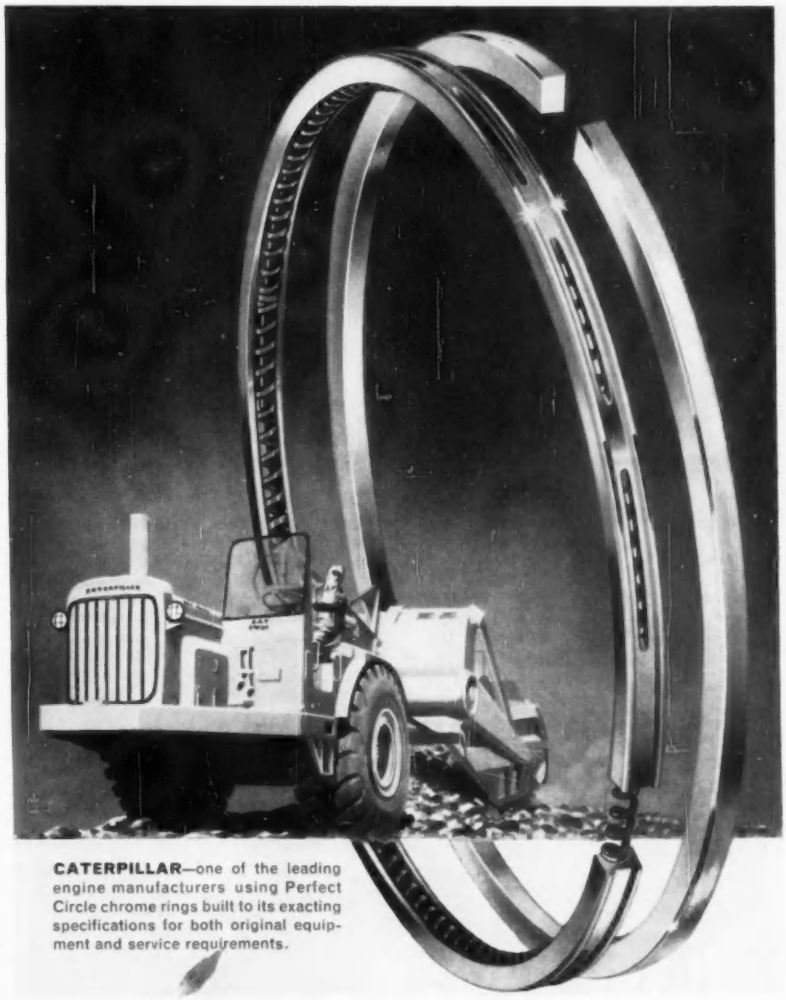
Pocket pH Meter Aids Power Industry

Problems involving pH control—acidity or alkalinity—can now be quickly and accurately checked with a pocket pH meter. The instrument, made by the Scientific Instruments Div., Beckman Instruments, Inc., gives on-the-spot pH readings in the laboratory, plant or field.

The unique feature of the pocket pH meter is the combination glass and reference electrode with a convenient 36-in. lead. This sensitive electrode may also be used while still clamped to the instrument's side—allowing the operator a free hand to make notations.

The meter is 6-in. long, 3-in. wide, 2-in. deep and weighs 2 lb. Measurements in the range of 2 to 12 pH are possible with readability of 0.1 pH. Lower pH values can be measured by a simple adjustment. Power is supplied by six, standard-type batteries.

For further details on any of these new products, detach the inquiry card in this magazine.



CATERPILLAR—one of the leading engine manufacturers using Perfect Circle chrome rings built to its exacting specifications for both original equipment and service requirements.

PARTNER IN PROGRESS to the DIESEL INDUSTRY

Year after year, Perfect Circle has been privileged to take an active part in the development of the wonderful power plants that are today's diesel engines.

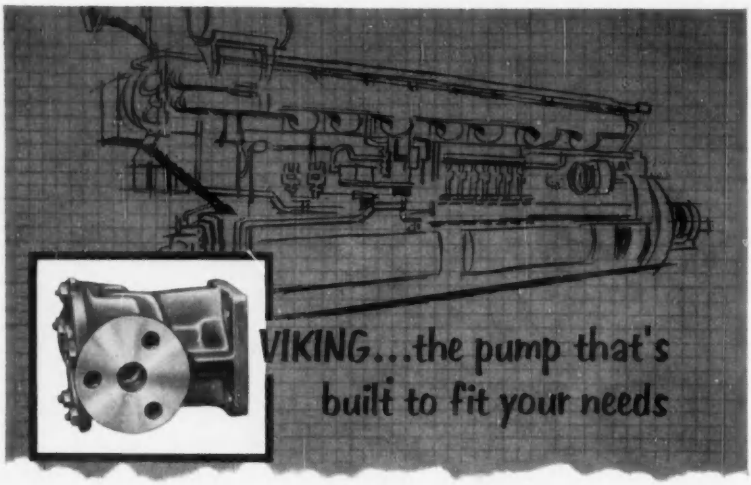
Leading diesel manufacturers use as original equipment and recommend for replacement service, piston rings developed in cooperation with Perfect Circle engineers because these rings are designed specifically for diesel duty.

When you specify rings made by Perfect Circle, you are specifying a proved product backed by 50 years of research, precision manufacturing and engineering leadership.

Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ontario, Canada.

PERFECT CIRCLE

PISTON RINGS



Whatever your needs in a pump . . . whether it's bearing lubrication, coolant or fuel delivery . . . there is a Viking Pump in the size you need—2/3 to 1050 GPM.

If you want a pump to fit your equipment, Viking will furnish the right pump. More than 750 catalogued models are available, PLUS special units. If you need special pumps, take advantage of Viking "know-how", based on experience in designing thousands of special pump installations.

For more information, write for Catalog 58Sd today.

VIKING PUMP COMPANY

Cedar Falls Iowa U S A In Canada it's "ROTO-KING" pumps

See our Catalog in Sweet's Industrial Construction and Plant Engineer's File

Tachographs help cut down "lugging"

...lengthen engine life...save fuel!

The RPM Tachograph is a recording tachometer which gives your operators a constant guide for proper engine operation, flashes a warning light when predetermined control speed is exceeded, and provides supervisors with an accurate charted record to check operator performance. In addition to engine speed in RPM, the Tachograph chart records time, total engine revolutions, and OFF periods.

A small investment in an RPM Tachograph for every diesel engine you operate can pay big dividends by reducing costly "lugging."

Tachographs are easy to mount and position on the instrument panel, are ruggedly built and tamper-proof. Bulletin SU-107 tells the whole story—mail the coupon today.

Wagner Electric Corporation

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Company_____

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new products

Vibration Dampers

Houdaille Industries, Inc. has come up with a new unit for solving problems of vibration control and energy absorption.

Uses for this untuned viscous rotary damper include servo-loop stabilization, rotational transient stabilization, torsional vibration damping and reduced drive and crankshaft stresses.

The unit consists of a free rotating inertia mass shearing a highly viscous synthetic fluid contained in a hermetically-sealed housing. Available in a wide range of sizes from 1½ in. to 34 in. diameter, these dampers have damping efficiency of about 80%, even though damping is 50% or 200% of optimum, Houdaille states.

Grease Lubricates Bearings At 600°F

Shell Oil Co. has developed a new "Extreme Temperature Grease" with an operating range from minus 45 to 600°F. It is intended to meet today's high-speed and high-temperature lubrication requirements.

The new grades are ETR Grease B and ETR Grease D. After being field tested for the past two year, the lubricant is said to meet most of the present requirements for extreme high-temperature lubrication of antifriction bearings.

In addition to its high temperature range, the grease is water resistant, has an extremely low evaporation rate and excellent mechanical stability.

Paint On Protection

Endura-temp is the name of a new paint for iron and steel which will reportedly withstand temperatures up to 1500° F. It multiplies the life of engine mufflers, exhausts and other equipment.

Made by Products Development Corporation, it is sprayed, brushed or dipped on clean metal surfaces. Priming is not desirable. One gallon protects 600 sq ft from corrosion and weather.

new products

Taper Plug For Repairing Castings

A new type of taper plug has been developed by the U. S. Casting Repair Corp. Called "Sealace Taper Plugs." these plugs are used for pining or lacing cracked engine blocks, heads, valve-ports, cylinders or any other automotive, industrial or marine castings.

An exclusive slotted hex-head permits tightening with either a wrench or a screwdriver. This allows easy access to previously hard to reach places. The taper on Sealace permits them to be tightened without channeling or other unnecessary operations. The plugs are very easy to peen. When used in conjunction with Sealace high-speed steel taper taps, no reaming is required.

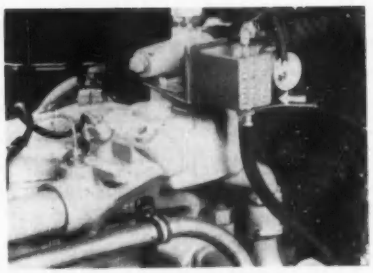
They are made of a specially-developed steel alloy that is guaranteed to withstand extremes in temperature and pressures of expansion and contraction.

Autocar Expands "AP" Planetary Line

A new planetary-axle tractor and a 50-ton capacity matched bottom-dump trailer have been developed by Autocar. They are for off-highway use in coal hauling operation.

The tractor, designated the Ap-25T, is the fourth model in an off-highway planetary line introduced within a year by Autocar Div. of The White Motor Co. It is powered by either a 335-hp NRTO or 375-hp NFT Cummins turbo-diesel.

Designed to reduce torque loads on the differential and axle shafts, the tractor features the typical planetary-gear-drive rear axle of the Autocar AP line. Planetary gears, a system of floating spur and ring gears, are located at the ends of the drive axle where final reduction takes place.



New "Water-Larm" Unit

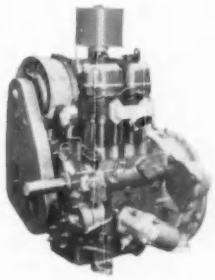
A new safety-alarm system has been developed by the Water-larm Corp., for use in trucks, tractors and other heavy diesel-powered equipment. It warns the operator that water is low, independently of any temperature indication.

"Water-larm", as it's called, has been put through extensive fleet tests. It warns the driver or maintenance man if water is low regardless of whether the engine is stopped or operating cold or hot. And it does this in plenty of time for him to prevent damage. It also registers a warning if water is suddenly lost from a broken hose.

(*Continued on Page* 52)

INTRODUCING A NEW LIGHTWEIGHT AIRCOOLED DIESEL ENGINE

Dumper powered by a PETTER 12.5 HP PC2 diesel engine.



The PC, an addition to the current range of PETTER engines, is manufactured in 1, 2, 3, and 4 cylinder configurations at a continuous speed of 3000 RPM and a horsepower rating of 6.25 per cylinder.
Now the right prime mover is available for concrete mixers, pumps, forklift trucks, dumpers, air compressors, cultivators, balers, combine harvesters, cranes, conveyors, refrigeration equipment and many other applications.

Air & Water-cooled diesel engines 3 to 200 HP

Diesel powered generating sets 1½ to 120 KW

SHORT DELIVERY

EXCELLENT SERVICE FACILITIES

PETTER ENGINE DIVISION — BRUSH ABOE, Inc.

60-07 39th Ave., Woodside, L. I., New York. DEfender 5-7100

people and plants

Administrative Engineer Retires

T. M. Robie, Administrative Engineer at Fairbanks, Morse & Co. has retired after 38 years of service. He has served in the experimental, service, manufacturing, sales and engineering departments.

He has been SAE Vice Pres. He is Secretary of the O.G.P. Div. of the ASME. He is also associated with the American Society for Quality Control and DEMA.

He has now formed Eibor Services, Inc., to handle consulting, publicity, technical writing, etc.

T. M. Robie

J. D. Harmison

A-C Sales Post

J. D. Harmison is appointed sales manager, material handling, Buda Division, Allis-Chalmers Manufacturing Company. He has been manager, parts sales, for the Tractor Group and originally joined the company in 1939.

New Sales Engineer for C-B

Appointment of Woodrow W. Waligore to the Odessa Branch Office of Cooper-Bessemer Corp. was announced by G. C. Woodard, General Sales Manager.

As a sales engineer, Mr. Waligore will work under the direction of C. L. McDougall, Branch Manager. He will contact operators on the engineering and application of reciprocating and centrifugal compressors for gas transmission and gas processing.

A graduate of the University of Texas, Mr. Waligore holds an engineering degree. Before coming to C-B, he was associated with The Humble Oil and Refining Co.

W. W. Waligore

Nicad Merges With Gould

Nicad, formerly Nickel Cadmium Battery Corporation, has become a part of the Gould-National family. Their new name is Gould-National Batteries, Nicad Division, Inc.

The same staff will continue headed by Granville B. Ellis, president and L. R. Mannheim, general sales manager. Plans are under way to increase production with the additional engineering, research and financial resources now available through this merger.

New Distributor For Deutz Diesels

Rex Engineering Corp. has been appointed exclusive representative for Maryland of Deutz diesels. This was announced by R. D. Friedlander, General Sales Manager of the Diesel Energy Corp.

This American corporation is the sole U. S. representative of Kloeckner-Humboldt-Deutz A. G., Cologne, West Germany, one of the world's largest diesel engine manufacturers.

Since 1948, Kloeckner-Humboldt-Deutz has built and sold more than 300,000 Deutz air-cooled diesels.

BRIGGS OFFERS YOU, FREE, A 16 PAGE MANUAL ON OIL FILTERS AND METHODS OF INSTALLATION

HERE is a big 8½" x 11", file size, 16 page, fully illustrated booklet. It's brimful of technical data and drawings that every designer and operating engineer will want to read or keep for ready reference. Write for your copy. No obligation.

Briggs OIL FILTERS

FILTER/SEPARATORS

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LIGHTWEIGHT CHAMPIONS

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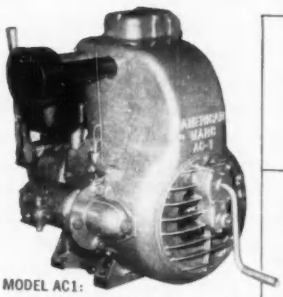

MODEL AC1:
Air-cooled, one-cylinder, four-cycle. 6.5 BHP @ 1800 RPM. Wt.: 220 lbs.

MODEL KBA-605: 7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.

MODEL AC2: Air-cooled, two-cylinder, four-cycle, V-type 14 BHP @ 1800 RPM. Wt.: 350 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

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universal peak firing and compression pressure indicator

The Model K-120 is the only maximum pressure indicator that can be used as a compression tester on small, high-speed engines and as a firing pressure indicator on engines having indicator valves. Patented Kiene diaphragm type check valve of stainless steel has no springs or piston, no complicated adjustments, temperature corrections or pressure loss. Bleeder valve permits release of indicator pressure for repeat readings. This instrument gives true pressure readings with an uncompensated gage.

Adaptors for most models U.S.A. engines. Others made to order at reasonable prices.

KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

Reorganization at GE

To improve over-all operating efficiency, General Electric has revamped its Locomotive and Car Equipment Department into three independent product sections.

Guy W. Wilson, general manager, announces managers of these new sections. Frank A. Compton, Jr. heads the Locomotive Section; Forman H. Craton manages the Equipment Section and Joseph V. Neill will oversee the Repairs and Renewal Parts Sales Section.

Handling Cummins Service

To insure application engineering and service to all Cummins users in the area, Russel-Hipwell Engines, Ltd. has opened a branch in St. John's, Newfoundland. Cummins diesels power many hundreds of off-highway trucks, shovels, generating sets and marine propulsion and auxiliary engines in that province.

John E. Hammond has been transferred from the head office to manage this new branch.

Serving Industry

Walter C. Sweet, left, is presented with 1957 D. C. Ball Award for Distinguished Oakite Service by John A. Carter, president. Named for the founder of the firm, the annual honor goes to the man who best serves Oakite customers. Mr. Sweet has been technical service representative in Minneapolis since 1946.

Heads Minneapolis-Moline Sales

M. E. Carroll, director of field sales, has been promoted to general sales manager of Minneapolis-Moline Company.

With the firm for 21 years, Mr. Carroll will be responsible for all sales operations — domestic, foreign and OEM. He will also have charge of market research, customer services, parts, technical publications and the service organization. During the war years he served as parts specialist in both the Army and Navy.

Worthington Appointments

George Steven has been appointed Assistant General Manager of the Compressor and Engine Div. of Worthington Corp. in Buffalo.

Mr. Steven, Manager of Engineering at Buffalo since 1945, has been with Worthington for 31 years.

H. W. Whiting succeeds Mr. Steven as Manager of Engineering. He served as Assistant Chief Engineer and Chief Engineer of the Compressor Section and has been Assistand to the Manager of Engineering since 1952.

(Continued on Page 57)

new literature

Closures for Pressure Test Sealing and Dirt Exclusion

A new brochure from Moeller Mfg. Co. details sizes and types of special seal and test plugs. Snap-Tite and Turn-Tite closures will seal openings of various sizes and shapes to permit pressure testing with air or liquid.

Typical applications include sealing radiator openings to test for core leaks; similar application for testing heat exchangers; closing block openings for pressure-testing water system or the lube oil system. They will save time and trouble in engine repair and rebuilding shops.

Special closures are also made for sealing engine openings during operation. For example, a combination seal and dipstick and a crankcase breather seal exclude airborne dirt from the crankcase. Use the Reader Service card to obtain further details.

Earthmovers As Soil Conservers

International Harvester Company points up the vital role of earthmoving equipment in soil and water conservation. Called "Blueprint for Opportunity Unlimited", the booklet outlines six steps to implement the nation's program.

Among many statistics given is construction of over a million farm ponds planned to conserve run off water.

Design Data on Shaft Coupling

Two bulletins with helpful design information on shaft coupling problems are offered by H. S. Watson Company.

No. F-10 gives general data. It lists conditions where shafts and couplings should be considered. It outlines types of Watson shafts and couplings available. Bulletin F-11 gives complete engineering data on flexible shaft selection and installation.

Cuno Releases General Catalog

A new general catalog (58-100) by Cuno Engineering Corp. on its complete line of filters and strainers for fluids and gases is now available.

Specifications, performance characteristics, application data and illustrations of Cuno's Auto-Klean, Super Auto-Klean and Flo-Klean edge-type filters; Micro-Klean fiber cartridge-type filters; Poro-Klean porous-metal filters; and Micro-Screen screen-mesh filters, are given to facilitate selection and use.

GM Truck Diesel Brochure

New line of diesel engines for trucks of 26,000 lb gross vehicle weight and up are described in a 6-page piece just released by Detroit Diesel Engine Div. of GM. Covered are the new 71-D and Turbopower engines designed to provide low-cost mileage for all types of highway hauling units.

GRIND CRANKSHAFTS IN THE BLOCK!
The Winona Lathelok Crankshaft Grinder has given fast, accurate service in the Automotive field for over 18 years. Now it's available to the Diesel field. With a new large hook, the standard grinder will now grind shafts up to 3½" in diameter in the block!
WRITE FOR DESCRIPTIVE LITERATURE AND PRICES.
WINONA TOOL MFG. CO.
WINONA, MINN. U.S.A.

Nugent Booklet Tells Of 60 Years of Progress

Wm. W. Nugent & Co., Inc. has released a 28-page booklet called "60 Years Serving Industry—1897-1957".

The booklet gives historical background of the company. It also explains its progress to date in developing oil filters; strainers; telescopic oilers; oiling and filtering systems; oiling devices; sight feed valves; and flow indicators.

New GM Operators Manual

A new Operators Manual, Form 6SE128, prepared for the 4-cyl Detroit Diesel Series 51 engine is now available. The new manual supersedes Form 6SE66 and contains new features that provide engine users with complete operating instructions.

A new type lubrication and preventive maintenance section illustrates the important lubricating points and shows the time at which the various engine components are to be serviced.

The new storage procedure for all Detroit Diesel engines is included in the manual along wtih a new section on the Hydrostarter. Procedures for adjusting the torque converter output shaft, mechanical governor and its linkage, and for cleaning exhaust ports by hand or by the water induction method are introduced in manual form. Along with the engine trouble shooting charts are similar charts for the Torqmatic converter and Hydrostarter.

Two Cat Catalogs

Just published by Caterpillar Tractor Co. is an 8-page piece on spark-ignition engines. Uses illustrated include oil well drilling, pipeline pumping and industrial machine powering.

One particularly interesting application describes two Cat spark-ignition engines which burn free sewage gas to power blowers for the 40-million gpd treatment works in Peoria, Ill.

Also offered by Cat is a booklet telling how their equipment helps meet the heavy highway demand for aggregates. On-the-job photos show machines in quarrying, crushing and dredging operations.

New I-R Flier Describes Pumps

A newly-published flier describes Ingersoll-Rand's centrifugal, medium-pressure range pumps designed for continuous heavy-duty operation. It includes cross-sectional views and a complete table of pump dimensions.

These pumps (RT, RTS and RTL) are for general hydraulic service. They are especially suited for pipeline pumping, steel-mill descaling, mine drainage, and boiler-feeding.

They are horizontally-split, single-suction pumps built with 3, 4, 6 or 8 stages for capacities from 200 to 2800 gpm.

Spring Specification Chart

A new spring specification chart for the lubricating oil systems in all Series of Detroit Diesel engines can be obtained from Detroit Diesel Sales and Service outlets. The chart, Form 7SE119, has been revised to include the 2-cyl Series 71 engine in addition to the specifications for the 3, 4 and 6-cyl engines in that series. Also, newly included are specifications for the Series 51 and Series 110 engines. This chart should be referred to when checking the condition of springs in the lubricating system when Spring Tester Tool J 5237 is used.

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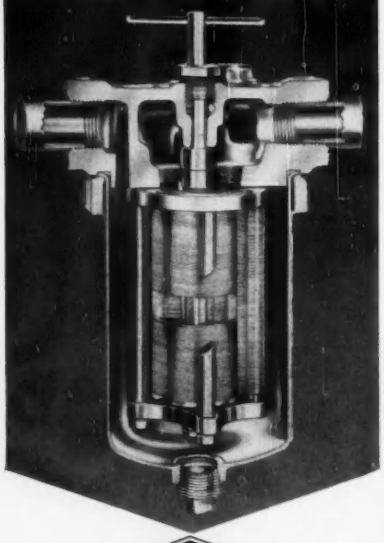

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902 South Vine St., Meriden, Conn.
Filtration Engineers in Principal Cities

CUNO

new products

(*Continued from Page* 47)

New Generator Permits Larger Motor Starting

Electric Machinery Mfg. Co. has developed a new generator. The machine features a static exciter and a voltage regulator with no moving parts. The regulator is of the magnetic-amplifier type.

The fast voltage-regulating ability of this type of regulator provides the important feature of permitting the generator to start larger motors.

For example, a generator of conventional construction rated at 50 kw, 1200 rpm, would start a 10-hp motor with full voltage starting and an allowable 25% voltage dip during starting. The new E-M generator (50 kw, 1200 rpm) under the same starting condition will start a 15-hp motor.

The generators, trademarked "Amp-Pak", are available in ratings from 50 to 150 kw.

Koppers Expands Small Couplings Line

Koppers Company's Metal Products Div. has added two new sizes to its Model B line of Fast's couplings. The purpose is to fill an expanding industrial need for light, rugged couplings to connect small pumps, fans and conveyors with prime movers.

Model B couplings are now available in sizes #1 and #3. These two sizes have been added to the #1½, #2, and #2½ couplings which have been made for some time. This establishes a complete line of Model B couplings for shafts up to 3⅛-in.

Model B couplings are made of forged steel throughout. Over-all dimensions are smaller than standard but the bore is larger in relation to these dimensions. Semi-fluid lubricants or grease must be used in accordance with the manufacturer's instructions.

Hi-Lo Hydraulic System Gauge

A new 2-in-1 gauge for hydraulic systems gives precision readings for both low pressure and high pressure. This unit, made by Minneapolis-Moline, permits quick and accurate diagnoses of automotive and industrial-type hydraulic system troubles. It has an exclusive MM divider valve which provides this dual-gauge function.

The high pressure gauge range is from 250 to 3000 psi, the second gauge from zero to 400 psi.

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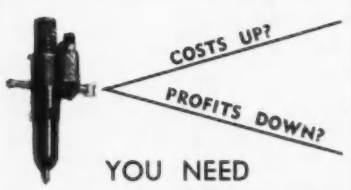

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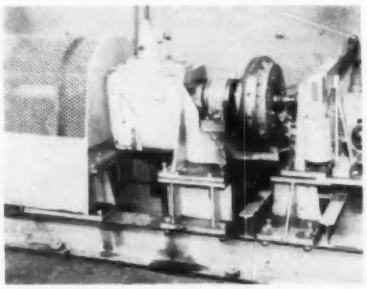
Interested in the Association's work? Plan now to attend the open Technical Sessions at the next meeting, Shamrock Hotel, Houston, Texas, Feb. 13-16, 1958.

ASSOCIATION of DIESEL SPECIALISTS, INC.

For information contact: S. E. Franklin, Secretary
P.O. Box 596, Wilmington, Calif.

industry news

(*Continued from Page 43*)



Clutch Testing Unit

To insure dependable performance, one manufacturer of heavy-duty clutches, the Lipe-Rollway Corp. uses extensive testing equipment. A carefully-planned program eases checking of pilot models prior to release for production.

Their laboratory test stand is equipped with a Dillion Model AN dynamometer to measure clutch torque capacity and facing wear rate. Load range during operation is between 200 and 400 lb.

In a punishing 3-day period, some 300 engagements of four seconds slip are made. The clutch cover assembly is rotated while the disc is kept stationary. By means of this method, and with an eye on the dynamometer, Lipe-Rollway engineers are able to obtain detailed data on pedal effort.

REA Conference is Coming Up

The 9th Annual REA Electric Generating Plant Operation and Maintenance Conference will be held at the Phoenix Hotel, Lexington, Kentucky, from April 7 through April 10, 1958.

The Conference Committee would like it understood that this conference is not restricted to REA cooperatives alone. The Committee wishes to invite any municipality or utility that desires to send a delegate. A five dollar registration fee is all that is required. For additional information, contact Mr. E. H. Holwick, 311 West Lexington Avenue, Winchester, Kentucky.

SAE Gets New Officers

Here's a list of some of the new officers of the Society of Automotive Engineers, Inc. for 1958:

President—W. K. Creson, Consulting Engineer, Ross Gear and Tool Co., Inc.

Vice President Representing Professional Activities:

Diesel Engine—L. D. Thompson, Project Engineer, charge of large engines, Utica-Bend Corp., Sub., Curtiss-Wright Corp.

Fuels and Lubricants—R. W. Goodale, Manager, Lubricant Div., Standard Oil Co. of California.

Production—J. E. Adams, Vice President, White Motor Co.

Tractor and Farm Machinery—M. Hansen, Chief Engineer, New Products, John Deere Research and Engineering Center.

Transportation and Maintenance—E. B. Ogden, Vice President, Equipment Development, Consolidated Freightways, Inc.

Truck and Bus—R. R. Burkhalter, Executive Engineer, Dana Corp.

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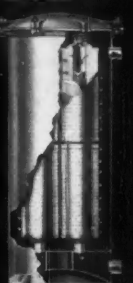

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people and plants

(Continued from Page 49)

General Sales Manager for Wilkening

Mr. W. E. Wilkening, President of Wilkening Mfg. Co., has announced promotion of Mr. J. O. Lutz to the newly-created post of General Sales Manager.

J. O. Lutz

Mr. Lutz will supervise sales activities of the Automotive Replacement Div. Mr. R. W. Doherty continues as Sales Manager, of the Industrial Div. Mr. H. R. Kelly continues as Sales Manager, of the Manufacturers or Original-Equipment Div. and Export Div.

Realignment at Fuller

Several changes have been made in executive responsibilities at Fuller Manufacturing Company, Transmission Division.

J. A. Packard has been promoted to general sales manager. He will be assisted by L. C. Butler. B. S. Tooker takes over as general service manager. R. E. Olmstead heads up all technical service activities and K. B. Klump is service parts manager.

Lister-Blackstone Distributor

Blackburn International Corp., has just been appointed New York distributor for Lister-Blackstone & Co., Ltd. This appointment of Lister-Blackstone represents an expansion of its operations to include the sale of imported machinery and parts in the United States.

Professor Retires

Dr. Paul H. Schweitzer, Professor of Engineering Research at The Pennsylvania State University, has retired with emeritus rank. He has been in charge of diesel engine research at the University since 1923.

He holds numerous patents relating to diesel engine improvements. Dr. Schweitzer's latest accomplishment—perfection of a method that improves diesel engine combustion—has been adopted experimentally by the Pennsylvania Railroad.

Dr. Schweitzer continues to serve as a consultant to a number of leading diesel engine builders and to the Ordnance Tank Automotive Command of the Army. He will also continue as senior partner, at the Schweitzer and Hussmann Engineering Office.

Hercules Houston Plant Moves

To provide better service in the Texas oilfield area, Hercules Motors Corporation has moved its Houston factory branch to larger quarters 3½ miles from the downtown section.

With one-third more space, larger stocks will be carried of Hercules engines and parts, and rebuilding and repair service will be expanded.

The Houston facility is staffed with factory trained personnel under the direction of James A. Embry, regional manager and David A. Otto, branch manager.

Appointed by Flexonics

James R. Strother has joined Flexonics Corporation, Maywood, as assistant sales manager for industrial hose products. Well known in Chicago sales circles, Mr. Strother was for nine years a sales engineer with Phillips Petroleum Co., and was Chicago Regional Manager for Aeroquip Corporation prior to coming to Flexonics.

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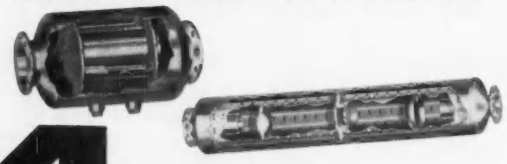

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Greenport Acceptance Tests

(*Continued from Page* 20)

Plus the utility being self-supporting, Greenport residents also received the following services without charge: lighting and power for streets, public buildings, four fire stations, police station, sewage disposal and water works. The six sewage pumping stations plus three of the five water pumping stations have a combined total of over 20 motor-driven pumps. Each of the other two water pumping stations has a 4-cyl Cat D3400 driving a Fairbanks-Morse turbine pump at 1600 rpm.

If the Village had to pay for this electrical service, $20,000 to $30,000 would have to come out of the taxpayers' pockets in some way. In addition to this service, Greenport has valuable assets in both plant and in land. Plus the power plant, it has the hundreds of acres on which the various municipal pumping stations are located. These were paid for through plant profits.

The men responsible for most of these benefits are Greenport's Mayor Otis Burt, now in his fourth term of office; Harry Monsell who started with the plant in 1912 and has been Superintendent of Utilities & Public Works since 1920; Robert Morris, Chairman Utilities Committee; and Russel Thompson, Chief Operator in charge of the plant, who has been with the plant for 32 years.

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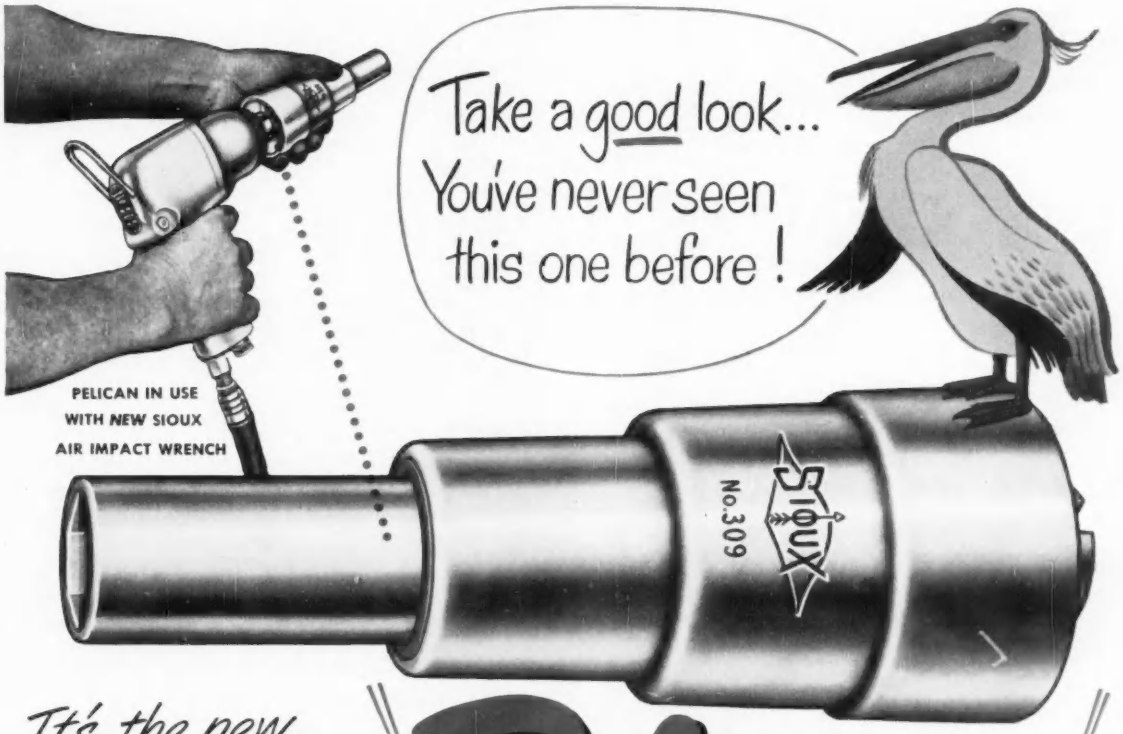

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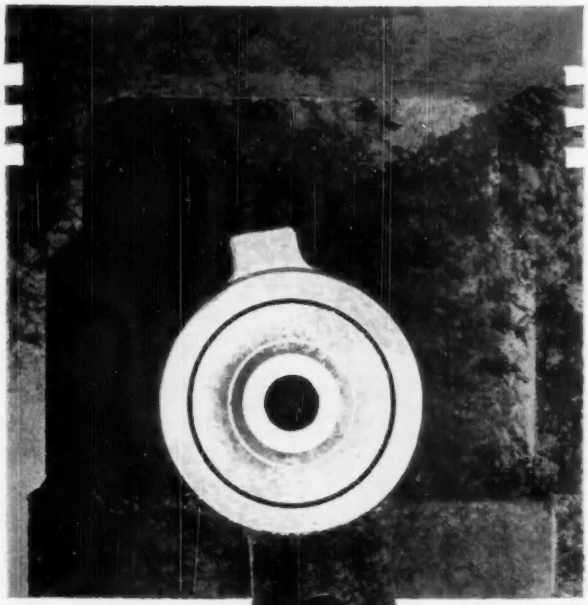

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